

entities with average annual gross revenues not exceeding \$15 million for the three preceding years.<sup>332</sup> Correspondingly, the *Service Rules Notice* proposed to provide the former with a bidding credit of 15 percent and the latter with a bidding credit of 25 percent.<sup>333</sup> We sought comment on our proposal to adopt these small business definitions and bidding credits for these bands.<sup>334</sup>

104. The *Service Rules Notice* also proposed separate small business standards for the 1427-1432 MHz band.<sup>335</sup> Specifically, we proposed a small business size standard for an entity with average annual gross revenues not exceeding \$15 million for the three preceding years, as well as a separate small business size standard for an entity with average annual gross revenues not exceeding \$3 million for the three preceding years.<sup>336</sup> We also proposed to provide the former with a bidding credit of 25 percent and the latter with a bidding credit of 35 percent.<sup>337</sup> The *Service Rules Notice* sought comment on whether these proposed small business definitions and bidding credits were appropriate for the 1427-1432 MHz band.<sup>338</sup> We also sought comment on whether the small business provisions proposed were sufficient to promote participation by businesses owned by minorities and women, as well as rural telephone companies.<sup>339</sup>

105. In addition to small business standards, the *Service Rules Notice* also sought comment on InsideTrax's proposal<sup>340</sup> that the Commission grant bidding credits to commercial entities that propose to use their spectrum to benefit public safety and assist tax-supported public service institutions such as police and fire departments.<sup>341</sup> InsideTrax suggested that such entities receive a bidding credit similar in scope to that provided to small businesses in the broadband PCS auctions.<sup>342</sup> The *Service Rules Notice* sought comment on whether such bidding credits would promote the public interest objectives described in Section 309(j)(3).<sup>343</sup> In particular, we asked commenters to address whether provision of this proposed bidding credit would be inconsistent with the purpose of Section 309(j) in light of the express exemption from competitive bidding provided to public safety radio services licensees.<sup>344</sup> We also asked commenters that favored InsideTrax's proposal to suggest eligibility standards and methods by which the Commission could determine entities' eligibility for such bidding credits.

106. Several commenters supported the *Service Rules Notice*'s proposal to apply the two tiered small business definitions to the 1670-1675 MHz band. ArrayComm states that the Commission's

<sup>332</sup> *Service Rules Notice*, 17 FCC Rcd at 2551 ¶ 146.

<sup>333</sup> *Id.* at 2551 ¶ 148.

<sup>334</sup> *Id.* at 2551 ¶ 146.

<sup>335</sup> *Id.* at 2551 ¶ 147.

<sup>336</sup> *Id.*

<sup>337</sup> *Id.* at 2551 ¶ 148.

<sup>338</sup> *Id.*

<sup>339</sup> *Id.* at 2552 ¶ 150.

<sup>340</sup> *Id.* at 2552 ¶ 151. InsideTrax, formerly known as MicroTrax, previously submitted comments to the *Allocation Notice* in which it proposed that the Commission adopt a public safety bidding credit. *Id.* See also InsideTrax Comments at 1.

<sup>341</sup> *Service Rules Notice*, 17 FCC Rcd at 2552 ¶ 151.

<sup>342</sup> *Id.*

<sup>343</sup> *Id.*

<sup>344</sup> See 47 U.S.C. § 309(j)(2).

proposed bidding credit structure for the 1670-1675 MHz band provides an appropriate competitive bidding credit scheme that will allow new companies offering innovative services a meaningful opportunity to bid for licenses.<sup>345</sup> AeroAstro endorses ArrayComm's support for the Commission's proposed bidding credit scheme for the 1670-1675 MHz band.<sup>346</sup>

107. Two commenters opposed the InsideTrax proposal to adopt a public safety bidding credit.<sup>347</sup> ArrayComm contends that the proposal would favor an exclusive public safety use of the 1670-1675 MHz band rather than encouraging free development of innovative value-added services, that the proposed bidding credit would encourage a reversion of the spectrum to "quasi-government use" and unfairly prejudice other applicants that have developed public safety use applications but also intend to provide commercial services.<sup>348</sup> Further, ArrayComm asserts that the proposal would unnecessarily complicate the Commission's designated entity bidding credit structure, particularly when a special bidding credit to ensure public safety is unnecessary since multiple providers have already indicated their intent to adopt a mixed-use service plan.<sup>349</sup> AeroAstro also opposes InsideTrax's proposal on the basis that a public safety bidding credit has no legal or policy support.<sup>350</sup> AeroAstro states that the personal location and monitoring service to be offered by InsideTrax will be primarily a commercial offering, with only occasional public safety use, and thus fails to meet the criteria of a "public safety radio services" exemption from auction under Section 309(j)(2)(A).<sup>351</sup> AeroAstro suggests that InsideTrax, recognizing that it does not qualify for the "public safety radio services" exemption, seeks a partial exemption through a new bidding credit.<sup>352</sup>

108. Discussion. As we proposed in the *Service Rules Notice*, we will adopt small business size standards for the unpaired 1390-1392 MHz, 1670-1675 MHz, and 2385-2390 MHz bands, and the paired 1392-1395 MHz and 1432-1435 MHz bands similar to those applied to the WCS 2.3 GHz band and the 700 MHz Guard Bands.<sup>353</sup> Specifically, with respect to the aforementioned bands, we will define an entity with average annual gross revenues for the three preceding years not exceeding \$40 million as a "small business," and an entity with average annual gross revenues for the three preceding years not exceeding \$15 million as a "very small business."<sup>354</sup> Correspondingly, we will adopt a bidding credit of

<sup>345</sup> ArrayComm Comments at 35-36.

<sup>346</sup> AeroAstro Reply Comments at 4.

<sup>347</sup> ArrayComm Comments at 37-38 and AeroAstro Reply Comments at 4-6. InsideTrax submitted comments and reply comments in support of its proposal. InsideTrax Comments at 9-11, InsideTrax Reply Comments at 8-9.

<sup>348</sup> ArrayComm Comments at 37-38.

<sup>349</sup> *Id.* at 38-39.

<sup>350</sup> AeroAstro Reply Comments at 4.

<sup>351</sup> *Id.* at 4-6.

<sup>352</sup> *Id.* at 6.

<sup>353</sup> See *Service Rules Notice*, 17 FCC Rcd at 2550-51 ¶¶ 144-146. Because we have adopted a licensing scheme that precludes the filing of mutually exclusive applications for licenses in the 1427-1432 MHz band, we will not be employing competitive bidding for this band and we do not need to adopt corresponding small business definitions and bidding credits as initially proposed in the *Service Rules Notice*. *Id.* at 2551 ¶ 147; see *supra* at ¶ 49. Additionally, we received no comments on the adoption of the Part 1 competitive bidding rules for the 1427-1432 MHz band.

<sup>354</sup> See *Service Rules Notice*, 17 FCC Rcd at 2550-51 ¶¶ 144-146. To be consistent with the size standard of "very small business" proposed for the 1427-1432 MHz band for those entities with average gross revenues for the three preceding years not exceeding \$3 million, the *Service Rules Notice* proposed to use the terms "entrepreneur" and "small business" to define entities with average gross revenues for the three preceding years not exceeding \$40 million and \$15 million, respectively. Because we are not adopting small business size standards for the 1427-1432

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15 percent for "small businesses" and a bidding credit of 25 percent for "very small businesses." This bidding credit structure is consistent with our standard schedule of bidding credits, which may be found at Section 1.2110(f)(2) of the Commission's rules.<sup>355</sup> All of the commenters addressing this issue supported our proposal to adopt the two small business definitions that the Commission adopted for the WCS 2.3 GHz band and the 700 MHz Guard Bands.<sup>356</sup> As we noted in the *Service Rules Notice*, the capital requirements and characteristics of the services proposed in the aforementioned bands are comparable to those found in the WCS 2.3 GHz band and 700 MHz Guard Bands.<sup>357</sup> Consequently, as with the WCS 2.3 GHz band and 700 MHz Guard Bands, we believe that these two definitions will provide a variety of businesses seeking to provide a variety of services with opportunities to participate in the auction of licenses for this spectrum and will afford such licensees, who may have varying capital costs, substantial flexibility for the provision of services.<sup>358</sup> The Commission has long recognized that bidding preferences for qualifying bidders provides such bidders with an opportunity to compete successfully against large, well-financed entities.<sup>359</sup> The Commission also has found that the use of tiered or graduated small business definitions is useful in furthering our mandate under Section 309(j) to promote opportunities for and disseminate licenses to a wide variety of applicants.<sup>360</sup>

109. We decline, however, to adopt a public safety bidding credit for the 1670-1675 MHz band. We agree with AeroAstro that there is no support in either the Communications Act or prior Commission decisions for creating a bidding credit for providing public safety services.<sup>361</sup> We also agree with ArrayComm that the proposed bidding credit would unnecessarily complicate the Commission's designated entity bidding credit structure.<sup>362</sup> In authorizing the Commission to use competitive bidding, Congress mandated that the Commission promote the objectives of Section 309(j)(3) and ensure that small businesses, rural telephone companies, and businesses owned by members of minority groups and

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MHz band, we instead use the terms "small business" and "very small business" to define entities with average gross revenues for the three preceding years not exceeding \$40 million and \$15 million, respectively.

<sup>355</sup> In the *Part 1 Third Report and Order*, we adopted a standard schedule of bidding credits, the levels of which were developed based on our auction experience. *Part 1 Third Report and Order*, 13 FCC Rcd at 403-04 ¶ 47. See also 47 C.F.R. § 1.2110(f)(2).

<sup>356</sup> See ArrayComm Comments at 35-36, AeroAstro Reply Comments at 4.

<sup>357</sup> *Service Rules Notice*, 17 FCC Rcd at 2550-51 ¶¶ 144-146. Generally, in developing the definitions for bidding preferences, the Commission evaluates the likely characteristics and capital requirements of the specific service. See *Part 1 Third Report and Order*, 13 FCC Rcd at 388 ¶ 18; Implementation of Section 309(j) of the Communications Act – Competitive Bidding, PP Docket No. 93-253, *Second Memorandum Opinion and Order*, 9 FCC Rcd 7245, 7269 ¶ 145 (1994).

<sup>358</sup> See *Service Rules Notice*, 17 FCC Rcd at 2550-51 ¶ 145.

<sup>359</sup> See, e.g., Revision of Part 22 and Part 90 of the Commission's Rules to Facilitate Future Development of Paging Systems; Implementation of Section 309(j) of the Communications Act -- Competitive Bidding, WT Docket No. 96-18, PR Docket No. 93-253, *Memorandum Opinion and Order on Reconsideration and Third Report and Order*, 14 FCC Rcd 10030, 10091 ¶ 112 (1999).

<sup>360</sup> 47 U.S.C. § 309(j)(3)(B), (4)(C)-(D). We will also not adopt special preferences for entities owned by minorities or women, and rural telephone companies. The Commission did not receive any comments on this issue, and we do not have an adequate record to support such special provisions under the current standards of judicial review. See *Adarand Constructors v. Peña*, 515 U.S. 200 (1995) (requiring a strict scrutiny standard of review for government mandated race-conscious measures); *United States v. Virginia*, 518 U.S. 515 (1996) (applying an intermediate standard of review to a state program based on gender classification).

<sup>361</sup> AeroAstro Reply Comments at 4.

<sup>362</sup> ArrayComm Comments at 37.

women are given the opportunity to participate in the provision of spectrum-based services.<sup>363</sup> In order to promote these objectives, Congress allowed the Commission to consider the use of certain procedures such as bidding preferences.<sup>364</sup> Section 309(j)(4)(D) does not reward a particular use of commercial spectrum, rather, it states that the Commission shall “ensure that small businesses, rural telephone companies, and businesses owned by members of minority groups and women are given the opportunity to participate in the provision spectrum-based services, and, for such purposes, consider the use of tax certificates, bidding preferences, and other procedures.”<sup>365</sup> Moreover, there is no indication that Congress intended to expand this group of beneficiaries to include an entity that certifies to the Commission that its sole or principal use of the non-exempt spectrum will be to benefit public safety or assist public safety entities.<sup>366</sup> Rather, to address the needs of the public safety community, Congress has separately authorized the Commission to designate spectrum as “public safety radio services” and exempted those services from competitive bidding under Section 309(j)(2).<sup>367</sup> Also, the Commission has previously

<sup>363</sup> See 47 U.S.C. § 309(j)(3)(B).

<sup>364</sup> See 47 U.S.C. § 309(j)(4)(D).

<sup>365</sup> *Id.* In the only instance where the Commission has provided for a bidding credit outside of the designated entity context set forth in Section 309(j)(4)(D), it did so to specifically encourage the provision of service to underserved tribal lands. 47 C.F.R. § 1.2110(f)(3). Moreover, both procedurally and in terms of bidding credit eligibility, the requirements of a Tribal Land bidding credit are substantially different from that of a traditional bidding credit. To obtain a Tribal Land bidding credit, a winning bidder is required to submit a long form application (Form 601) in which it must indicate that it seeks such a bidding credit and that it will amend its long form within 90 days to provide a certification from the tribal government that (1) the tribal government will allow the bidder to site facilities and provide service on tribal land; (2) that it will not enter into an exclusive contract with the bidder precluding entry by other carriers, and will not unreasonably discriminate against any carrier; and (3) that its tribal land is a qualifying tribal land as defined in the Commission’s rules, i.e., areas that have a telephone penetration at or below 70 percent. Extending Wireless Telecommunications Services to Tribal Lands, *Report and Order and Further Notice of Proposed Rule Making*, WT Docket No. 99-266, 15 FCC 11794, 11805-11806, ¶¶ 31-33 (2000) (“*Tribal Land Report and Order*”). Upon Commission receipt of these certifications, the bidding credit is awarded and the applicant will make payment of the final net adjusted bid amount. *Tribal Land Report and Order*, 15 FCC Rcd at 11806, ¶ 33. Recipients of the bidding credit are also required to meet specific performance and buildout requirements. *Id.* at 11806-09 ¶¶ 39-41.

<sup>366</sup> InsideTrax Comments at 9-10, InsideTrax Reply Comments at 9-10. See Implementation of Section 309(J) of the Communications Act-- Competitive Bidding, *Fifth Memorandum Opinion and Order*, PP Docket No. 93-253, 10 FCC Rcd 403, 430-431, ¶¶ 48-49 (1994) (“*Competitive Bidding Fifth MO&O*”) (“... individuals with disabilities are not expressly named as a designated entity in Section 309(j)(4)(D) of the Communications Act, and there is no indication in the legislative record of the statute that Congress intended to expand this group of beneficiaries . . .”).

<sup>367</sup> 47 U.S.C. § 309(j)(2)(A) states:

(2) Exemptions. - The competitive bidding authority granted by this subsection shall not apply to licenses or construction permits issued by the Commission -

(A) for public safety radio services, including private internal radio services used by State and local governments and non-government entities and including emergency road services provided by not - for-profit organizations, that -

- (i) are used to protect the safety of life, health, or property; and
- (ii) are not commercially available to the public; ...

In addition to Section 309(j)(2), Congress also authorized the Commission to grant licenses to public safety entities that apply for “unassigned” spectrum not otherwise allocated for public safety use. See 47 U.S.C. 337(c).

indicated that Congress did not intend the public safety radio services exemption to apply to *any* spectrum license that an individual applicant chooses to use for public safety purposes.<sup>368</sup>

110. Notably, the Commission has not allocated these bands for public safety radio services. We therefore agree with ArrayComm that InsideTrax's proposal, if adopted, would favor an exclusive public safety use of the 1670-1675 MHz band rather than encouraging free development of technologies and services.<sup>369</sup> We also believe that InsideTrax has not established an adequate record regarding the legal and policy implications of a bidding credit for bidders that certify that they will use spectrum in a manner that will benefit public safety or assist public service institutions such as police and fire departments.<sup>370</sup>

#### D. Technical Rules

##### 1. Part 27

##### a. General Requirements

111. Background. In the *Service Rules Notice*, we requested comment on whether we should apply Part 27 of the Commission's Rules for new services licensed in the paired 1392-1395 MHz and 1432-1435 MHz bands and the unpaired 1390-1392 MHz, 1670-1675 MHz and 2385-2390 MHz bands.<sup>371</sup>

<sup>368</sup> In the *BBA Report and Order*, the Commission found that the exemption should be evaluated in terms of its application to particular radio services rather than to particular classes or groups of licensees within a service. See *BBA Report and Order*, 15 FCC Rcd at 22741, ¶ 66; see also Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems, *Order on Reconsideration of the Second Report and Order*, 14 FCC Rcd. 1339, 1344, ¶ 8-9 (1999) (the Commission declined to grant petitioner's request for a public safety exemption, pursuant to Section 309(j)(2), from the bidding process for applicants intending to use a LMS license for public safety purposes.); Implementation of Sections 309(j) and 337 of the Communications Act of 1934 as Amended, *Memorandum Opinion and Order*, WT Docket No. 99-87, FCC 02-82, para. 24 (rel. April 18, 2002).

<sup>369</sup> ArrayComm Comments at 37-38. InsideTrax proposes an eligibility standard for the public safety bidding credit which requires eligible entities to certify that "the sole or princip[al] purpose of the services it intends to offer is to protect the safety of life, health, or property, and that its service will assist public officers in their missions to carry out these same functions." InsideTrax Comments at 10, InsideTrax Reply Comments at 10.

<sup>370</sup> See Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules, WT Docket No. 99-168, *Second Report and Order*, 15 FCC Rcd 5299, 5345 ¶ 110 (2000) (the Commission declined to adopt APCO's suggestion that it establish "auction credits" similar to small business bidding credits for state and local governments seeking spectrum for public safety communications because "[s]uch entities have not established a record that they need bidding credits in order to be able to compete in the auction."); Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules, *First Report and Order*, 15 FCC Rcd 476, 530 ¶ 135 (2000) (the Commission declined to adopt a proposal to grant bidding credits to any LPTV licensee that has been or will be displaced by a DTV station because an adequate record regarding the legal and policy implications of such bidding credits had not been established); Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services, *Second Report and Order, Order on Reconsideration, and Fifth Notice of Proposed Rulemaking*, 12 FCC Rcd 12545, 12693-94 ¶¶ 357-358 (1997) (the Commission declined to adopt the bidding credit proposed for commercial entities that set aside part of their capacity for educational institutions at preferential rates because there was no adequate record regarding the legal and policy implications of such bidding credits); *Competitive Bidding Fifth MO&O*, 10 FCC Rcd at 430-431 ¶¶ 48, 432, 50 (the Commission declined to expand definition of minorities to include persons with disabilities because petitioners did not establish a substantial record that demonstrates firms owned by persons with disabilities have any more difficulty accessing capital than any other small business).

<sup>371</sup> See *Service Rules Notice*, 17 FCC Rcd at 2538 ¶ 97.

We indicated that the application of general provisions of Part 27 of our rules would include technical standards relating to equipment authorization, Radiofrequency (RF) safety standards, frequency stability, antenna structures and air navigation safety, and disturbance of AM broadcast station antenna patterns.<sup>372</sup> In addition, we sought comment on other technical restrictions contained in other sections of the Commission's rules that would apply to licensees including Part 17 (antenna registration) and Sections 1.924 (quiet zones) and 1.1307 (environmental requirements) of our rules.<sup>373</sup>

112. Discussion. Because we are adopting a flexible licensing framework in this proceeding, we believe that the application of our Part 27 technical rules to new licenses assigned in the paired 1392-1395 MHz and 1432-1435 MHz bands and the unpaired 1390-1392 MHz, 1670-1675 MHz and 2385-2390 MHz bands would serve the public interest. Accordingly, as supported by the overwhelming majority of commenters, we are adopting our Part 27 technical rules, as modified herein.<sup>374</sup> With regard to the unpaired 1670-1675 MHz band, ArrayComm supports the application of our Part 27 technical rule standards with two significant exceptions: 1) the threshold levels for routine environmental evaluations listed in Section 1.1307 of our rules, and 2) the applicability of AM disturbance requirements of Section 27.63 of our rules.<sup>375</sup> We consider each of ArrayComm's proposals in turn.

113. *Threshold Levels for Routine Environmental Evaluation.* Sections 1.1307(b), 2.1091 and 2.1093 of our rules list services and devices for which an environmental evaluation for RF exposure must be routinely performed.<sup>376</sup> Section 1.1307(b) requires an environmental evaluation for all Part 27 fixed stations operating at an EIRP of 1640 watts or greater.<sup>377</sup> Sections 2.1091 and 2.1093 require routine environmental evaluation for all Part 27 mobile and portable devices.<sup>378</sup> ArrayComm requests that we apply the same threshold levels for routine environmental evaluation as Broadband PCS for fixed stations operating in the 1670-1675 MHz band.<sup>379</sup> The threshold levels for Broadband PCS generally require routine environmental evaluation for all building mounted fixed stations operating at more than 3280 watts EIRP or all non-building mounted fixed stations operating with more than 3280 watts EIRP at an antenna height of less than 10 meters above ground.<sup>380</sup> ArrayComm states that, although threshold levels for Broadband PCS are less restrictive, the safety of Broadband PCS levels is well established through thousands of commercially operating sites.<sup>381</sup> We agree.

114. The threshold levels for routine environmental evaluation are determined to ensure that the public is not exposed to RF levels that could exceed our guidelines. We generally require new transmitting facilities and devices to comply with the RF safety criteria and procedures that are applicable to facilities and devices having similar technical parameters and operating characteristics.<sup>382</sup> Pursuant to

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<sup>372</sup> *Id.*

<sup>373</sup> *Id.*

<sup>374</sup> ArrayComm Comments at 3; InsideTrax Comments at 5; AeroAstro Comments at 4.

<sup>375</sup> ArrayComm Comments at 20-21.

<sup>376</sup> 47 C.F.R. §§ 1.1307(b), 2.1091 and 2.1093.

<sup>377</sup> 47 C.F.R. § 1.1307(b), Table 1.

<sup>378</sup> 47 C.F.R. §§ 2.1091(c) and 2.1093(c).

<sup>379</sup> ArrayComm Comments at 21.

<sup>380</sup> 47 C.F.R. § 1.1307, Table 1.

<sup>381</sup> ArrayComm Comments at 21.

<sup>382</sup> The Commission has provided guidance on complying with its RF safety exposure limits in OET Bulletin No. 65. OET Bulletin No 65 (Edition 97-01) was issued in August 25, 1997, and is available for downloading at the FCC

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Section 1.1310, limits on RF emissions are based on the operating frequency of the transmitter.<sup>383</sup> Any transmitter operating between 1500 MHz and 100,000 MHz like, for example Broadband PCS,<sup>384</sup> will be subject to the same RF emission limits.<sup>385</sup> Because transmitters operating in the 1670-1675 MHz band will be subject to the same limits on RF emissions as applied to other transmitters operating between 1500 MHz and 100,000 MHz, we agree with ArrayComm that the Broadband PCS threshold levels for routine environmental evaluation are applicable to the 1670-1675 MHz band. Accordingly, we will apply the Broadband PCS threshold levels for routine environmental assessment to facilities in the 1670-1675 MHz band.

115. By similar analysis, we will also apply the same threshold levels for routine environmental evaluation to operations licensed in the paired 1392-1395 MHz and 1432-1435 MHz bands and the unpaired 1390-1392 MHz and 2385-2390 MHz bands. Because transmitters operating between 1500 MHz and 100,000 MHz are subject to the same limits on RF emission,<sup>386</sup> the 2385-2390 MHz band will be the subject to the same limits on RF emissions as Broadband PCS. Although the limits on RF emissions become more stringent below 1500 MHz, we do not believe that variance in these limits for the paired 1392-1395 MHz and 1432-1435 MHz bands and the unpaired 1390-1392 MHz band compared to Broadband PCS warrants imposing a different threshold level for routine environmental evaluation. According, we will apply the same threshold level for routine environmental evaluation for the paired 1392-1395 MHz and 1432-1435 MHz bands and the unpaired 1390-1392 MHz band that we currently apply to Broadband PCS transmitters.

116. *AM Disturbance Requirements.* Section 27.63 states that licensees who construct or modify towers in the immediate vicinity of AM broadcast stations are responsible for correcting any disturbance to the AM station's antenna pattern, if the disturbance occurred as a result of such construction or modification.<sup>387</sup> Section 27.63 also requires a licensee to notify an AM station prior to construction or modification of any tower located within 1 kilometer (0.6 mile) of a non-directional AM broadcast station or within 3 kilometers (1.9 miles) of a directional AM broadcast station array.<sup>388</sup> Once notification has occurred, the licensee is responsible for performing measurements to determine whether the construction or modification of the tower would affect the AM station antenna pattern.

117. ArrayComm requests that we change the AM disturbance requirements of Section 27.63 to be applicable only if there is a valid technical concern that an operation might disturb AM broadcast stations.<sup>389</sup> We are not persuaded that there is reason to modify these requirements. The provisions of Section 27.63 ensure that the towers of AM broadcasters are adequately protected from harmful interference that may arise sporadically and unexpectedly from nearby uses of the spectrum. Because ArrayComm's proposal would tend to eviscerate the bright-line certainty of our rule with regard to notification and technical measurements, and thus weaken an AM broadcaster's ability to protect itself

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Web Site: [www.fcc.gov/oet/rfsafety](http://www.fcc.gov/oet/rfsafety). Copies of OET Bulletin No. 65 also may be obtained by calling the FCC RF Safety Line at (202) 418-2464.

<sup>383</sup> 47 C.F.R. § 1.1310.

<sup>384</sup> Broadband PCS operates from 1850-1990 MHz.

<sup>385</sup> 47 C.F.R. § 1.1310.

<sup>386</sup> *Id.*

<sup>387</sup> 47 C.F.R. § 27.63.

<sup>388</sup> *Id.*

<sup>389</sup> ArrayComm Comments at 21.

from disturbances from the surrounding environment, we decline to adopt ArrayComm's proposal on this issue.

## 2. In-Band Interference Control

118. Background. In the *Service Rules Notice*, we requested comment on additional technical requirements to limit co-channel interference between licensees operating in adjacent geographic service areas.<sup>390</sup> We acknowledged that licensees will be permitted to implement a broad range of services and technologies in this spectrum, and that the implementation of these services and technologies must take into account the potential for interference between licensees using the same spectrum in adjacent service areas.<sup>391</sup> Under our rules, licensees in the paired 1392-1395 MHz and 1432-1435 MHz bands and the unpaired 1390-1392 MHz, 1670-1675 MHz, and 2385-2390 MHz bands will have the flexibility to provide fixed and mobile services including land mobile.<sup>392</sup> We indicated that in the past we have primarily utilized an approach to limit co-channel interference between geographic service areas that includes field strength limits or frequency coordination.<sup>393</sup> Field strength limits have generally been adopted for land mobile services,<sup>394</sup> while frequency coordination requirements have primarily been used in fixed services.<sup>395</sup>

119. Discussion. Because we believe that field strength limits at the licensee's boundaries are essential to limit co-channel interference and can be independently predicted and verified by a commercial operator,<sup>396</sup> we are adopting this approach rather than requiring coordination. Both ArrayComm and AeroAstro support the use of field strength limits employed at the licensee's boundaries to limit co-channel interference.<sup>397</sup> No commenter supported a frequency coordination approach. We received no comments regarding co-channel interference for the paired 1392-1395 MHz and 1432-1435 MHz bands and the unpaired 1390-1392 MHz and 2385-2390 MHz bands. ArrayComm further states that the field strength limit used for PCS, or 47 dBuV/m would be appropriate.<sup>398</sup> AeroAstro believes a maximum emission level into a neighboring license area of -35 dBW/Hz is appropriate.<sup>399</sup> Because experience has demonstrated the adequacy of the field strength limit employed for PCS,<sup>400</sup> and given that this field strength limit is the same value currently used for 2.3 GHz WCS,<sup>401</sup> we decline to adopt AeroAstro's proposal. Instead, we will specify a maximum field strength of 47 dBuV/m at a edge of the licensee's boundaries for the paired 1392-1395 MHz and 1432-1435 MHz bands and the unpaired 1390-1392 MHz band. For additional flexibility in these bands, we will also allow licensees in adjacent areas to negotiate a different field strength limit. There will be no need to impose a field strength limit at the

<sup>390</sup> See *Service Rules Notice*, 17 FCC Rcd at 2538-39 ¶¶ 98-104.

<sup>391</sup> *Id.* at ¶ 98.

<sup>392</sup> *Id.*

<sup>393</sup> *Id.* at ¶ 99.

<sup>394</sup> See 47 C.F.R. § 24.236 (for PCS); see also 47 C.F.R. § 27.55 (2.3 GHz band).

<sup>395</sup> See 47 C.F.R. § 101.103 for fixed microwave services.

<sup>396</sup> *Id.*

<sup>397</sup> ArrayComm Comments at 21-22; AeroAstro Comments at 8.

<sup>398</sup> ArrayComm Comments at 22.

<sup>399</sup> AeroAstro Comments at 8.

<sup>400</sup> 47 C.F.R. § 24.236.

<sup>401</sup> 47 C.F.R. § 27.55(a).



border for the 1670-1675 MHz and 2385-2390 MHz bands because these bands will be licensed on a nationwide basis.<sup>402</sup>

### 3. Out-of-Band Interference Control

120. In the *Service Rules Notice*, we sought comment on appropriate out-of-band emission limits, and/or emission masks, and whether one or both of these methods would be necessary to protect services operating adjacent to the paired 1392-1395 MHz and 1432-1435 MHz bands and unpaired 1390-1392 MHz, 1670-1675 MHz and 2385-2390 MHz bands.<sup>403</sup> In addition, we requested comment on corresponding measurement procedures to confirm emission levels.<sup>404</sup>

#### a. 1670-1675 MHz Band.

121. Background. For the 1670-1675 MHz band, we sought comment on proposals for out-of-band emission limits submitted by AeroAstro, ArrayComm, and InsideTrax.<sup>405</sup> AeroAstro, ArrayComm, and InsideTrax all reiterated their support for the individual proposals they put forth in response to the *Reallocation Notice*.<sup>406</sup> AeroAstro favors controlling out-of-band emissions with an absolute power spectral density limit.<sup>407</sup> AeroAstro states that an absolute limit, rather than an emission mask tied to in-band power, will permit a less steep emission mask, and hence a less expensive radio.<sup>408</sup> AeroAstro proposes a limit of  $-80 \text{ dBW/Hz}$ .<sup>409</sup> InsideTrax proposes a limit of  $55+10\log(P)$ . InsideTrax suggests an out-of-band limit, in any 1 MHz bandwidth, of  $55+10\log(P)$  where "P" is the highest emission in watts of the transmitter inside the authorized bandwidth.<sup>410</sup> InsideTrax states that the resolution bandwidth of the instrumentation used to measure power should be 100 kHz, except that a minimum spectrum analyzer resolution bandwidth of 300 Hz should be used for measurement of center frequencies within 1 MHz of the edge of the authorized bandwidth.<sup>411</sup>

122. ArrayComm proposes an out-of-band emission limit similar to PCS service, except with an adjustment for "adaptive antenna" systems, a type of technology they propose to deploy. ArrayComm states that where the output of multiple power amplifiers operating at comparable per-carrier powers are coherently combined, the out-of-band emission limit should be  $43+10\log(P)-10\log(M)$ , where "P" is the per-carrier, per-power-amplifier power serving a carrier and "M" is the number of power amplifier/antenna elements serving a carrier.<sup>412</sup> ArrayComm proposes a minimum resolution bandwidth of 500 kHz but indicates that a lower resolution bandwidth may be employed near the band edge.<sup>413</sup> In

<sup>402</sup> See discussion *supra* Sections IV.A.2.c, IV.A.2.d. Nationwide licensees who partition their license will have the flexibility to decide how to limit interference at the border of the partition. See discussion *supra* Section IV.B.6.

<sup>403</sup> See *Service Rules Notice*, 17 FCC Rcd at 2539-40 ¶105.

<sup>404</sup> *Id.*

<sup>405</sup> *Id.* at 2540 ¶¶ 107-111. These proposals were submitted in response to the *Reallocation Notice* in ET Docket No. 00-221, *supra* note 8.

<sup>406</sup> AeroAstro Comments at 8; ArrayComm Comments at 25; InsideTrax Comments at 12.

<sup>407</sup> AeroAstro Comments at 8.

<sup>408</sup> *Id.*

<sup>409</sup> *Id.*

<sup>410</sup> InsideTrax Comments at 12.

<sup>411</sup> *Id.*

<sup>412</sup> See ArrayComm Comments at 21, filed in response to the *Reallocation Notice* in ET Docket No. 00-221.

<sup>413</sup> See ArrayComm Reply Comments at Appendix I, p. 7 to *Reallocation Notice* in ET Docket No. 00-221.

the *Service Rules Notice*, we tentatively proposed ArrayComm's limit because it appeared to be the most flexible.<sup>414</sup> Nonetheless, we sought comment on whether ArrayComm's proposal would sufficiently protect lower-adjacent radioastronomy operations from harmful interference.<sup>415</sup>

123. Discussion. In determining whether we should adopt specific out-of-band emission limits, and/or emission masks to protect services operating adjacent to the 1670-1675 MHz band, we must be sensitive to balance the needs of adjacent-band operations with our goals to promote the development of viable services in the 1670-1675 MHz band pursuant to our overall spectrum management objectives. Because we believe that this balance is properly achieved through an approach that is neither technology-specific nor too stringent or too flexible, we are adopting the standard  $43 + 10\log(P)$  limit on out-of-band emissions for equipment in the 1670-1675 MHz band. We believe this standard strikes the proper balance between protecting adjacent-band operations and allowing for viable service in the 1670-1675 MHz band. All emissions outside the licensees authorized bandwidth must be limited by a factor of  $43 + 10 \log(p)$  dB below the transmitter power ( $p$ ). Compliance with this provision shall be based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth. These are the same procedures established in Section 27.53(a)(4) of our rules for 2.3 GHz WCS.<sup>416</sup>

124. We decline to adopt the InsideTrax proposal because it proposes a standard that is approximately 12 dB more restrictive than the standard limit on out-of-band emissions that we generally employ for other services. Of all the proposals, the InsideTrax proposal is the most restrictive. We are particularly concerned that this proposal would limit flexibility and thus damage the viability of prospective services offered in this band. Whereas InsideTrax is too restrictive, we decline to adopt the AeroAstro proposal because it presents a standard that would be much less restrictive than the standard limit of  $43 + 10\log(P)$ .<sup>417</sup> We believe that for the purpose of sound engineering practices equipment in this band should be capable of achieving the minimal standard limit on out-of-band emission limits of  $43 + 10\log(P)$ . Accordingly, we decline to adopt AeroAstro's proposal.

125. We also decline to adopt ArrayComm's proposal because ArrayComm's proposal is too technology specific. The ArrayComm standard would require most equipment to satisfy the standard out-of-band emission limit of  $43 + 10\log(p)$ , while allowing systems with an adaptive antenna to meet a less restrictive out-of-band emission limit of  $43 + 10\log(P) - 10\log(m)$ , where  $m$  is the number of amplifiers or elements in the array. As an initial matter, for the purpose of good engineering practices, we believe that any standard should be capable of achieving the minimal limit of  $43 + 10\log(P)$ , which is used for a variety of services. Depending on the design and number of elements in the design, coupled with other factors, ArrayComm's technology would actually exceed the standard  $43 + 10\log(P)$  limit on out-of-band emissions by variable amounts. Further, as indicated in the *Service Rules Notice*, we do not know what kind of technologies will eventually be employed in these bands.<sup>418</sup> When establishing technical limits for these bands, we prefer to take a technology-neutral approach that will allow licensees to implement a broad range of services and technologies. Thus we do not believe that the public interest would be served

<sup>414</sup> See *Service Rules Notice*, 17 FCC Rcd at 2540 ¶ 112.

<sup>415</sup> *Id.*

<sup>416</sup> 47 C.F.R. § 27.53(a)(4).

<sup>417</sup> For example, AeroAstro's proposed limit of  $-80$  dBW/Hz will exceed the standard limit of  $43 + 10\log(p)$  when measured over a bandwidth larger than 5 kHz.

<sup>418</sup> *Service Rules Notice*, 17 FCC Rcd at 2509 ¶¶ 16-17.

if we were to adopt technical requirements that would tend to favor one technology over another. Accordingly, we decline to adopt ArrayComm's proposal.

**b. 1.4 GHz Band.**

126. Background. We received no specific comments regarding out-of-band emission limits for the paired 1392-1395 MHz and 1432-1435 MHz bands and the unpaired 1390-1392 MHz.

127. Discussion. As with the 1670-1675 MHz band, we will require all emissions outside the licensees authorized bandwidth to be limited by a factor of  $43 + 10 \log(p)$  dB below the transmitter power (p).<sup>419</sup> As we have previously discussed, we believe this standard strikes the proper balance between protecting adjacent-band operations and allowing for viable services in the paired 1392-1395 MHz and 1432-1435 MHz bands and the unpaired 1390-1392 MHz.<sup>420</sup> As we indicated for the 1670-1675 MHz band, compliance with this provision shall be based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth.

128. We note, however, that the 1392-1395 MHz band is immediately adjacent to the WMTS band at 1395-1400 MHz.<sup>421</sup> Therefore, in addition to the limits on out-of-band emissions we impose here we will also limit the emission from stations in the 1392-1395 MHz band into the adjacent WMTS band at the site of any WMTS operations. This limitation will be discussed in a following section.<sup>422</sup>

129. Philips Medical Systems (Philips) states that protecting WMTS operations in the 1395-1400 MHz band from harmful interference could be problematic if band managers are allowed to operate in the paired 1392-1395 MHz and 1432-1435 MHz bands because the spectrum user is not actually a Commission licensee.<sup>423</sup> Philips contends that it would be more difficult to hold such operators accountable for causing harmful interference to WMTS.<sup>424</sup> We note, however, that band managers in this proceeding are governed by Part 27 of our rules. Therefore, band managers are specifically required to terminate any operation causing harmful interference, and that spectrum operators are required to comply with all Commission Rules.<sup>425</sup> In addition, band managers will be subject to the limits we establish in Part 27 for emissions into the WMTS band.<sup>426</sup> Therefore, we believe that the approach we adopt in this proceeding will adequately address the concerns raised by Philips.

**c. 2385-2390 MHz Band.**

130. Background. XM Radio requests that we adopt strict out-of-band emission limits for the 2385-2390 MHz band to protect Satellite Digital Audio Radio Service (SDARS) from interference.<sup>427</sup>

<sup>419</sup> See discussion *supra* ¶ 123.

<sup>420</sup> *Id.*

<sup>421</sup> 47 C.F.R. § 2.106.

<sup>422</sup> See discussion *infra* Section IV.F.2.b.

<sup>423</sup> Philips Medical Systems Comments at 6.

<sup>424</sup> *Id.* at 6.

<sup>425</sup> 47 C.F.R. § 27.602 (e-f).

<sup>426</sup> See discussion *infra* Section IV.F.2.b.

<sup>427</sup> XM Comments at 4.

Specifically, XM Radio requests that we apply the out-of-band emission limits of the WCS bands at 2305-2320 MHz and 2345-2360 MHz to the 2385-2390 MHz band.<sup>428</sup> XM Radio states that SDARS licensees are somewhat more susceptible to interference from out-of-band emissions than other spectrum users because the SDARS downlink signal power available to the receiver is much lower than terrestrial-based communications systems.<sup>429</sup>

131. Discussion. Because we are not convinced that the limits on out-of-band emissions for the 2385-2390 MHz band are analogous to that of WCS operations in the 2305-2320 MHz and 2345-2360 MHz bands, we deny XM Radio's request. Instead, we will require the new licensee in 2385-2390 MHz band to limit all emissions outside the authorized bandwidth by the standard factor of  $43 + 10 \log(p)$ . We believe that this standard strikes the proper balance between protecting adjacent-band operations and allowing for a viable service in the 2385-2390 MHz band. Compliance with this provision shall be based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth.

132. Unlike existing WCS operations in the 2305-2320 MHz and 2345-2360 MHz bands, which are immediately adjacent to the SDARS band, the 2385-2390 MHz band is separated by 40 MHz from the edge of the SDARS band. The potential for harmful interference to SDARS from operations in the 2385-2390 MHz band is therefore much less than that from existing WCS operations. In addition, the WCS operations are likely to be located in predominantly in urban areas. We note that SDARS has been granted special temporary authority and requested permanent authorization to provide "fill-in" service with terrestrial base stations.<sup>430</sup> If granted, this will generally increase the signal strength of the SDARS signals in these areas and surrounding areas. For these reasons and in consideration of the potential cost or service implications a stricter technical standard would impose on the development of mobile operations in this band, we disagree with XM's position.

#### **d. Power and Antenna Height Limits**

133. Background. In the *Service Rules Notice*, we requested comment on what power limits and antenna height limits would be necessary for operations in these bands.<sup>431</sup> We observed that transmitters used in the private land mobile service, cellular radio service, and point-to-point microwave services typically employ substantially different output powers.<sup>432</sup> Accordingly, we invited comments as to what those limits should be and the basis for the suggested limits.<sup>433</sup>

134. Discussion. Because we do not know what technologies will eventually be deployed in these bands,<sup>434</sup> we prefer to adopt an approach that will allow licensees to implement a broad range of services and technologies. As we have previously stated, we do not want to set limits that will exclude

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<sup>428</sup> *Id.*

<sup>429</sup> *Id.* at 3.

<sup>430</sup> See XM Radio, Inc., Application for Special Temporary Authority to Operate Satellite Digital Audio Radio Service Complimentary Terrestrial Repeaters, Order and Authorization, DA 01-2172 (rel. September 17, 2001) and Sirius Satellite Radio, Inc., Application for Special Temporary Authority to Operate Satellite Digital Audio Radio Service Complimentary Terrestrial Repeaters, Order and Authorization, DA 01-2171 (rel. September 17, 2001).

<sup>431</sup> *Service Rules Notice*, 17 FCC Rcd at 2539 ¶ 104.

<sup>432</sup> *Id.*

<sup>433</sup> *Id.*

<sup>434</sup> *Id.* at 2509 ¶16-17.

one type of technology or offer one type of technology an advantage over another. Under the flexible licensing construct we adopt in this proceeding, we therefore are adopting power and antenna height requirements that we deem conducive to sound spectrum management principles.

135. With regard to the 1670-1675 MHz band, we are adopting a 2000 watt EIRP maximum for base equipment and a 4 watt EIRP maximum for mobile equipment, as proposed by ArrayComm.<sup>435</sup> We believe that these values seem to strike the proper balance between allowing flexible use of the band while limiting RF to safe levels. These limits will enable a licensee to deliver a wide-area broadband data service.<sup>436</sup> We believe that even with these power levels, protection of adjacent-band and co-channel Government operations can be achieved through the out-of-band emission limits discussed above and through coordination procedures discussed in following sections.<sup>437</sup> This approach is consistent with out spectrum management goals than either AeroAstro's<sup>438</sup> or InsideTrax's<sup>439</sup> proposal because it will ensure protection from interference without compromising flexibility.

136. AeroAstro states that limits on output power and EIRP must be consistent with protection of adjacent band operations at 1660.5-1670 MHz and co-channel meteorological-satellite earth stations.<sup>440</sup> AeroAstro states that low operating power will make it easy to assure co-channel protection at specified sites.<sup>441</sup> InsideTrax states that high power transmitters would necessitate substantially larger exclusion zones around protected Government facilities.<sup>442</sup> We believe, however, that the strict limits proposed by AeroAstro and InsideTrax would limit the viability of service in the 1670-1675 MHz band. As we indicated above, we believe that protection even with the higher limits power proposed by ArrayComm, protection of Government facilities can still be achieved. Therefore, we decline to adopt the power limits proposed by AeroAstro or InsideTrax. We find no technical basis to impose limitations on antenna height in the 1670-1675 MHz band. Nonetheless, we reserve the right to revisit this future should circumstances or facts warrant.

137. We received no comments regarding power limits or antenna height limits for the unpaired 1390-1392 MHz and 2385-2390 MHz bands. We believe that a similar flexible approach is applicable for these bands as well. Consequently, for the unpaired 1390-1392 MHz and 2385-2390 MHz bands we will establish a maximum limit of 2000 watt EIRP for fixed sites and 4 watts EIRP for mobile units. In the 2385-2390 MHz band, the power limitation for mobile units will apply to aeronautical mobile as well as terrestrial mobile units. As with the 1670-1675 MHz band, we see no compelling reason to set antenna height limits in these bands.

138. We received no comments regarding power limits for the paired 1392-1395 MHz and 1432-1435 MHz bands. Philips Medical Systems, however, expresses concern regarding operation in the 1392-1395 MHz band causing adjacent band interference to WMTS.<sup>443</sup> We note that the 1392-1395 MHz

<sup>435</sup> ArrayComm Comments at 22.

<sup>436</sup> *Id.*

<sup>437</sup> See discussion *infra* Section IV.E.1.

<sup>438</sup> AeroAstro proposes a peak output power of 1 watt, a peak EIRP of 10 watts and an antenna height of 6 meters above ground or building for the 1670-1675 MHz band.

<sup>439</sup> InsideTrax generally supports AeroAstro power limits but requests less stringent levels of 4 watts peak power and 0.25 watts average power limit over 60 second time interval. InsideTrax Reply Comments at 11.

<sup>440</sup> *Id.*

<sup>441</sup> *Id.*

<sup>442</sup> *Id.*

<sup>443</sup> Phillips Comments at 5-6.

portion of the paired bands is adjacent to the WMTS band at 1395-1400 MHz. Interference to adjacent-band WMTS operations is difficult to control because WMTS is licensed by rule and operations may occur at various locations throughout a metropolitan area. Therefore, in order to reduce the possibility of interference to adjacent-band WMTS, we will impose less flexible limits on maximum power for stations in the 1392-1395 MHz band. Specifically, we will limit fixed stations to a maximum power of 100 watts EIRP and mobile units to a maximum power of 1 watt. These values are comparable to the maximum power limits we establish for the 1429.5-1432 MHz band that is also adjacent to WMTS.<sup>444</sup> The 1432-1435 MHz portion of the paired bands does not have the same adjacent-band issues with regard to WMTS, therefore, we will establish more flexible limits of 2000 watt EIRP for fixed sites and 4 watts EIRP for mobile units. As with the other bands in this proceeding, we see no compelling reason to set antenna height limits for these paired bands.

#### 4. Part 90 Telemetry

139. Background. In the *Service Rules Notice*, we requested comment on technical restrictions for secondary telemetry operations in the 217-220 MHz band, the 1427-1429.5 MHz band, and primary telemetry operations in the 1429.5-1432 MHz band.<sup>445</sup> We noted that telemetry operations in these bands are authorized under Part 90 of our rules and that Part 90 provides no technical specifications or channel plan for telemetry operations in these bands.<sup>446</sup> Rather, power and authorized bandwidth for telemetry are specified on the authorization on a case-by-case basis. Because telemetry applications in these bands will no longer require FAS approval, we now believe that technical specifications and a channel plan are now necessary for these bands.<sup>447</sup>

##### a. 217-220 MHz.

140. Discussion. Channel Plan. In lieu of the FAS approval process, frequency coordination will now be employed for secondary telemetry in this band. We therefore believe that a channel plan is necessary to assist frequency coordinators in assigning frequencies for secondary telemetry operations in this band. To maximize the utility and efficiency of this band and in consideration of the record on this issue, we are adopting a 6.25 kHz channel spacing requirement for narrowband operations in this band.<sup>448</sup> Similar to our approach in the MAS Services, we will also permit secondary telemetry licensees to combine contiguous channels of up to 50 kHz, or more than 50 kHz upon a showing of adequate justification.<sup>449</sup> We believe that this channel plan will provide licensees the flexibility to customize their operations within a variety of bandwidths without promoting one technology or application over another.<sup>450</sup>

141. Power/Antenna Height. We continue to believe that power and antenna height restrictions on secondary telemetry in the 217-220 MHz band are necessary to minimize the possibility of harmful

<sup>444</sup> See discussion *infra* Section IV.F.2.b.

<sup>445</sup> See *Service Rules Notice*, 17 FCC Rcd at 2526-27 ¶¶ 66-69.

<sup>446</sup> *Id.* at 2526 ¶ 66.

<sup>447</sup> *Id.*

<sup>448</sup> DataFlow Comments at 6; Watchman Comments at 3.

<sup>449</sup> 47 C.F.R. § 101.147(b).

<sup>450</sup> See Fairfield Comments at 10, 11. See also Fleetwood Comments at 2 (opposing any channel plan that would limit the channel bandwidth to less than 25 kHz).

interference to primary users in the 217-220 MHz band.<sup>451</sup> Based on the record before us, we will limit the transmitter output power of secondary telemetry in the 217-220 MHz band to 2 watts.<sup>452</sup> We will also limit the antenna height above average terrain (HAAT) to 152 meters (500 feet).<sup>453</sup> Although Fairfield does not believe that height and power restrictions for the 217-220 MHz band are necessary,<sup>454</sup> we believe that the limits we are adopting here strike a balance between allowing flexible secondary telemetry operations and limiting harmful interference from secondary operations to primary operations. Further, because geophysical transmitters such as those employed by Fairfield operate at a very low power, we believe that the possibility for any adverse impact arising from the flexible height and power restrictions we are adopting here would be minimal.

142. *Out-of-Band Emission/Frequency Stability.* Because we are not convinced that new out-of-band emission standards would promote the public interest, we decline to adopt new rules and thus retain the current emission mask standards. We believe that the current emission masks standards B and C in Section 90.210 of our rules are sufficient to address adjacent channel interference concerns arising from spurious emissions.<sup>455</sup> With regard to frequency stability, we note that our rules do not currently subject equipment in the 217-220 MHz band to a particular frequency stability standard. Because we believe that a frequency stability standard will promote use of equipment that satisfies a minimum acceptable standard for operability, we are adopting a frequency stability requirement. Specifically, given the current and prospective service uses of the 217-220 MHz band, we believe that the frequency stability standard for land mobile systems in the nearby 150-174 MHz band<sup>456</sup> is equally applicable in this band. Accordingly, we are adopting a standard that will allow a frequency stability of 1 part per million for fixed and base stations and 1 part per million for mobile units.<sup>457</sup> One commenter has proposed a similar approach.<sup>458</sup>

143. *Minimum Antenna Gain.* DataFlow states that a requirement for minimum front-to-back ratio of 18 dB for antennas will decrease co-channel spacing.<sup>459</sup> No other commenter proposed or discussed minimum antenna gain requirements. Because we find no reason to adopt rules requiring a minimum antenna gain and in the absence of a substantial record on the same, we decline to adopt rules implementing an antenna gain requirement at this time, but reserve the right to revisit this issue in the future.

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<sup>451</sup> AMTS is primary in the 217-218 MHz and 219-220 MHz portions of the band. The 218-219 MHz service is primary in 218-219 MHz portion of the band.

<sup>452</sup> See DataFlow Comments at 6 (stating that a maximum antenna height above average terrain of 500 feet will cover even the largest local governmental unit with a single frequency); Watchman Comments at 3.

<sup>453</sup> See, e.g., DataFlow Comments at 6.

<sup>454</sup> See Fairfield Comments at 4 (stating that the Commission should not adopt generic rules that may hamper the ability of companies like Fairfield that provide conduct geophysical research).

<sup>455</sup> 47 C.F.R. §§ 90.210(b) and (c). DataFlow and Fleetwood recommend technical specifications that we believe would be redundant and therefore onerous in consideration of our existing emission mask standards. See DataFlow Comments at 6 (stating that spurious emissions should be attenuated by at least 60 dB to decrease adjacent channel interference); Fleetwood Comments at 2 (stating that radiated out-of-band emission limits should be greater or equal to 84 dBuV and that conducted out-of-band emission limits should be greater or equal to 94 dBuV).

<sup>456</sup> See 47 C.F.R. § 90.213(a).

<sup>457</sup> *Id.*

<sup>458</sup> Fleetwood Comments at 2 (specifying a standard of 5 parts per million).

<sup>459</sup> DataFlow Comments at 6.

b. 1427-1432 MHz<sup>460</sup>

144. Discussion. Channel Plan. As generally noted above, because these bands will now be subject to frequency coordination, we will require a channel plan to assist coordinators in assigning frequencies for both secondary telemetry and primary telemetry in the 1.4 GHz band. Although commenters express mixed opinions with regard to proper channel size as well as whether a channel plan should be adopted at all,<sup>461</sup> we believe that the public interest will benefit from the added protections provided by a channelization of the entire 1427-1432 MHz band. Based on the record before us, we believe that spectrum efficiency will be maximized by implementing a channel plan that promotes flexibility and minimizes the potential for harmful interference. Accordingly, we are adopting a channel spacing requirement of 12.5 kHz. We note that this channel plan is also consistent with the majority of narrowband operations described by commenters in this band.<sup>462</sup> Similar to our approach in the MAS Services, we will also permit licensees in this band to combine contiguous channels of up to 50 kHz, or more than 50 kHz upon a showing of adequate justification.<sup>463</sup> We believe that this channel plan will provide licensees the flexibility to customize their operations within a variety of bandwidths without promoting one technology or application over another.

145. Power/Antenna Height. Power limits for telemetry operations in the 1427-1432 MHz band are discussed in Section IV.F.2.b.iii. This section deals with the AHA-Itron Joint Agreement which proposes several limitations for telemetry operations in order to protect WMTS from harmful interference.<sup>464</sup> The Joint Agreement does not propose antenna height limits for telemetry operations in the 1427-1432 MHz band. Nor did we receive any comments regarding limiting the antenna height of telemetry operations in this band. In light of the technical restrictions we employ on telemetry to protect WMTS from harmful interference, we believe that antenna height limits for telemetry operations in the 1427-1432 MHz band are unnecessary.<sup>465</sup>

146. Mileage Separation. In the *Service Rules Notice*, we requested comment on standards for determining whether specific telemetry systems in the 1429.5-1432 MHz band can coexist.<sup>466</sup> We proposed a mileage separation standard of 112 km (70 mi.) for co-channel systems. Because we are requiring frequency coordination for primary and secondary telemetry throughout this band, we decline to adopt our tentative proposal. Rather than impose a mileage separation standard, we will require the frequency coordinator to determine the appropriate separation distance for co-channel and adjacent channel telemetry systems. While Itron and UTC support our initial 112 km (70 mi.) standard,<sup>467</sup> we believe that our decision will also accommodate telemetry systems, such as Hexagram's, that can be spaced closer because they operate with 1 to 2 watts transmitter power output.<sup>468</sup> This approach will promote greater frequency reuse and more efficient use of the spectrum.

<sup>460</sup> The technical restrictions we discuss below will also apply to secondary and primary telemetry operations in the seven geographic "carve-out" areas.

<sup>461</sup> Itron opposes a channel plan for this band. Itron Comments at 8; *see also* UTC Comments at 10 (stating that no channel plan is necessary for secondary telemetry at 1427-1429.5 MHz).

<sup>462</sup> *See* Hexagram Comments at 10.

<sup>463</sup> 47 C.F.R. § 101.147(b).

<sup>464</sup> *See supra* note 84.

<sup>465</sup> *See* discussion *infra* Section IV.F.2.b.

<sup>466</sup> *Service Rules Notice*, 17 FCC Rcd at 2525 ¶ 61.

<sup>467</sup> *See* Itron Comments at 5.

<sup>468</sup> *See* Hexagram Comments at 7.



## E. Coordination

### 1. Incumbent Government Operations

147. In the *Service Rules Notice*, we listed Federal Government incumbents who would remain in these bands on a co-primary basis as identified in the *Reallocation Report and Order*.<sup>469</sup> We received several comments regarding these incumbents.

#### a. RadioAstronomy

148. Background. Pursuant to footnote US311 of Section 2.106, radioastronomy is performed throughout the 1350-1400 MHz band.<sup>470</sup> The location of these radioastronomy sites is listed in footnote US311.<sup>471</sup> Under footnote US311, licensees in the 1.4 GHz band will need to make every practicable effort to avoid causing interference to these extremely sensitive radioastronomy receivers.<sup>472</sup> In addition, radioastronomy operations will continue to operate in the 1660-1670 MHz band.<sup>473</sup> This band is lower-adjacent to the 1670-1675 MHz band. In the *Service Rules Notice*, we stated that protection of radioastronomy operations in this lower-adjacent band will be accomplished through technical limits established for equipment operating in the 1670-1675 MHz band, namely out-of-band emission requirements.<sup>474</sup>

149. Discussion Several commenters suggest that we establish additional technical specifications or procedures to protect Radioastronomy from harmful interference.<sup>475</sup> The National Academy of Sciences through the National Research Council's Committee on Radio Frequencies (CORF) indicates that threshold levels for interference detrimental to radioastronomy are described in a report published by the International Telecommunication Union.<sup>476</sup> CORF states that these threshold levels should be the basis for Commission rules on out-of-band emission limits or emission masks for services operating in the 1.4 GHz and 1.6 GHz bands.<sup>477</sup> CORF states as an alternative to out-of-band emission limits, protection of radioastronomy operations in the 1350-1427 MHz and 1660-1670 MHz bands could be accomplished through exclusion and coordination zones.<sup>478</sup>

150. Cornell agrees with CORF that emission limits should be established using threshold levels recommended by ITU.<sup>479</sup> Alternatively, Cornell suggests that protection of radioastronomy in the 1350-1427 MHz and 1660-1670 MHz bands could be accomplished through exclusion zones and coordination zones.<sup>480</sup> ArrayComm states that as a practical matter, meaningful protection of

<sup>469</sup> See *Service Rules Notice*, 17 FCC Rcd at 2541-44 ¶¶ 115-123. See also 47 C.F.R. § 2.106, footnotes US229, US352, US361, US352, US362 and US363.

<sup>470</sup> See *Service Rules Notice*, 17 FCC Rcd at 2544 ¶ 123. See also 47 C.F.R. § 2.106, footnote US311.

<sup>471</sup> 47 C.F.R. § 2.106, footnote US311.

<sup>472</sup> See *Service Rules Notice*, 17 FCC Rcd at 2544 ¶ 123.

<sup>473</sup> *Id.*

<sup>474</sup> *Id.*

<sup>475</sup> See NAS Comments; ArrayComm Comments and Cornell Comments.

<sup>476</sup> NAS Comments at 4. See also ITU Report ITU-R RA.769-1.

<sup>477</sup> NAS Comments at 4.

<sup>478</sup> *Id.* at 5.

<sup>479</sup> Cornell Comments at 4.

<sup>480</sup> *Id.*

radioastronomy operations in the 1660-1670 MHz band can only be achieved if the commercial systems in the 1670-1675 MHz band are prevented from operating in the immediate vicinity of protected radioastronomy sites.<sup>481</sup> ArrayComm supports CORF proposal for protecting radioastronomy sites listed in footnote US311 and also supports proposed threshold levels for interference recommended in ITU Report.<sup>482</sup>

151. We acknowledge the importance of information gathered from radioastronomy observations in the 1350-1400 MHz and 1660-1670 MHz bands. As CORF states, Radioastronomy measurements have identified the birth sites of stars in our own galaxy and characterized the complex evolution and distribution of galaxies in the universe.<sup>483</sup> We note, however, that under footnote US311 radioastronomy operations in the 1350-1400 MHz band are conducted on an unprotected basis.<sup>484</sup> While we remain sensitive to the need to protect sensitive radioastronomy sites, the imposition of coordination requirements and exclusion zones on primary licensees – as suggested by CORF – would be tantamount to upgrading radioastronomy from secondary to primary status. Therefore, we decline to adopt the coordination requirements and exclusion zones proposed by CORF for these secondary operations. We believe that, given the small number and remote locations of observatories, licensees in the 1390-1392 MHz and 1392-1395 MHz bands can easily accommodate radioastronomy operations in these bands on a case-by-case basis. We note that footnote US311 requires parties to make every practicable effort to protect radioastronomy facilities that operate on an unprotected basis.<sup>485</sup>

152. Furthermore, we note that under footnote US74, radioastronomy observations in the 1660-1670 MHz band are conducted on a primary basis.<sup>486</sup> These operations, however, are protected from adjacent-band interference only to the extent that adjacent-band radiation exceeds the limits on out-of-band emissions established for that service.<sup>487</sup>

153. We believe that such coordination procedures could be unnecessary depending on the type of technology that is eventually deployed in the 1670-1675 MHz band. For instance InsideTrax indicates that their proposed power limits for the 1670-1675 MHz band would be sufficiently low that all likelihood of interference to radioastronomy operations in the 1660-1670 MHz band would be minimized.<sup>488</sup> Given the small number and remote locations of observatories, we believe that the 1670-1675 MHz licensee can easily accommodate adjacent-band radioastronomy on a case-by-case basis. Along these lines, AeroAstro states that they are committed to protection of radioastronomy in the 1660-1670 MHz band and that, if necessary, they will consult with radioastronomy operators to find the best means of achieving needed protection.<sup>489</sup> Therefore, we decline to adopt the coordination procedures proposed by CORF and supported by ArrayComm for licensees in the 1670-1675 MHz band.

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<sup>481</sup> ArrayComm Comments at 27.

<sup>482</sup> *Id.* at 15-16.

<sup>483</sup> NAS Comments at 1.

<sup>484</sup> 47 C.F.R. § 2.106, footnote US311.

<sup>485</sup> *Id.*

<sup>486</sup> 47 C.F.R. § 2.106, footnote US74.

<sup>487</sup> *Id.* We note that radioastronomy antennas are highly directional and pointed skyward, therefore, radioastronomy operations are more apt to discriminate signals from terrestrial stations.

<sup>488</sup> InsideTrax Comments at 13.

<sup>489</sup> AeroAstro Comments at 8-9.

154. ArrayComm requests that the Commission specifically identify radioastronomy sites to be afforded protection. We note that footnote US311 already lists the location of radioastronomy sites by city, state and coordinates. In order to clarify the location of radioastronomy observations, we will indicate that the radioastronomy observations specified in footnote US74 occur at the locations listed in footnote US311. Finally, Cornell requests we clarify that the procedures established in Section 1.924(a) and 1.924(d) for protection of the radioastronomy site in Green Bank, West Virginia and Arecibo, Puerto Rico will apply to licensees in the bands which are the subject of this proceeding.<sup>490</sup> We note that in the *Service Rules Notice*, we indicated that the quiet zone requirements of Section 1.924 would apply to licensees in the paired 1392-1395 MHz and 1432-1435 MHz bands and unpaired 1390-1392 MHz, 1670-1675 MHz and 2385-2390 MHz bands.<sup>491</sup> These are the procedures applicable to the Green Bank and Arecibo facilities.

**b. Radiosondes**

155. Background. We did not propose additional rules or approaches with regard to our treatment of radiosondes in the *Service Rules Notice*.<sup>492</sup> As part of the reallocation to non-Government use, radiosondes were reallocated from the 1670-1675 MHz band.<sup>493</sup> Radiosondes are still allocated on a primary basis in the upper and lower adjacent bands to the 1670-1675 MHz band.<sup>494</sup>

156. Discussion. ArrayComm claims that the *Service Rules Notice* is in conflict with the 1995 *NTIA Spectrum Reallocation Report* regarding the protection of radiosonde operations.<sup>495</sup> Specifically, ArrayComm points to the fact that protection criteria for radiosonde operations are outlined in Appendix C of the 1995 *NTIA Spectrum Reallocation Report*.<sup>496</sup> ArrayComm believes that the conflict arises because the *Service Rules Notice* does not propose codifying these protection criteria into the service rules for the 1670-1675 MHz band. ArrayComm suggests that spectral power flux density limits specified in Appendix C of the 1995 *NTIA Spectrum Reallocation Report* be the criteria for the protection of radiosonde operations in the adjacent band,<sup>497</sup> and that these protection limits be codified into the service rules.

157. We note that the protection criteria listed in Appendix C of the 1995 *NTIA Spectrum Reallocation Report* were established to allow mixed Government and non-Government use of the 1670-1675 MHz band – on a more restricted basis – prior to the transfer of the spectrum.<sup>498</sup> Moreover, we note that the allocation for radiosonde operations in the adjacent 1668.4-1670 MHz and 1675-1700 MHz bands offers no special protection from interference by operations in the 1670-1675 MHz band.<sup>499</sup> Adjacent-band radiosonde operations will receive protection from interference only to the extent that such radiation

<sup>490</sup> Cornell Reply Comments at 5.

<sup>491</sup> See *Service Rules Notice*, 17 FCC Rcd at 2538 ¶ 97.

<sup>492</sup> A radiosonde is an automatic radio transmitter in the meteorological aids service usually carried on an aircraft, free balloon, kite, or parachute that transmits meteorological data. See 47 C.F.R. § 2.1.

<sup>493</sup> See 1995 *NTIA Spectrum Reallocation Report* § 5, p.4.

<sup>494</sup> 47 C.F.R. § 2.106. In the lower-adjacent 1668.4-1670 MHz, footnote US99 states that meteorological aid services (radiosonde) will avoid operations to the maximum extent practicable. 47 C.F.R. § 2.106, footnote US99.

<sup>495</sup> See ArrayComm ex parte letter dated February 26, 2002.

<sup>496</sup> See 1995 *NTIA Spectrum Reallocation Report*, Appendix C.

<sup>497</sup> See ArrayComm Comments at 34, filed in response to the *Reallocation Notice*, ET 00-221.

<sup>498</sup> See 1995 *NTIA Spectrum Reallocation Report*, Appendix C.

<sup>499</sup> 47 C.F.R. § 2.106.

exceeds the limits we establish for out-of-band emissions in the 1670-1675 MHz band.<sup>500</sup> Finally, ArrayComm states that the location of radiosonde sites must be known in advance by the 1670-1675 MHz licensee. In Appendix D, we provide an informational list of radiosonde sites supplied by the NTIA.

**c. Earth Exploration Satellite Service**

158. **Background.** CORF requests that we provide protection to the Earth Exploration Satellite Service (EESS).<sup>501</sup> The EESS is a satellite system that monitors the global atmosphere and surface state of the Earth.<sup>502</sup> The EESS measures the total power upwelling from the Earth in 80 kilometer by 80 kilometer cells.<sup>503</sup> CORF requests that we limit the maximum out-of-band emissions into the 1400-1427 MHz band by limiting the maximum number of transmitters which can be placed in any 80 kilometer by 80 kilometer cell.<sup>504</sup>

159. **Discussion.** Because EESS operations will receive protection from adjacent-band primary terrestrial operations only to the extent that such radiation exceeds the limits we establish for out-of-band emissions in the 1392-1395 MHz and 1427-1432 MHz bands, we decline to adopt CORF's proposal. While we remain sensitive to the need to protect this passive service, the imposition of protection requirements specified by CORF would pose onerous constraints on primary terrestrial operations in the bands adjacent to the 1400-1427 MHz band. Thus while we encourage prospective licensees to maintain such protection wherever feasible, we decline to mandate the protection criteria proposed by CORF.

**2. FAS Coordination**

**a. LPRS**

160. In the *Service Rules Notice*, we proposed to allow LPRS, which is licensed by rule, to operate within the SPASUR protection radii without requiring individual station licenses.<sup>505</sup> Because we continue to believe that standard coordination procedures would be overly burdensome, impractical, or ineffective for LPRS, we are adopting our proposal in the *Service Rules Notice*. Specifically, although we still prohibit LPRS devices from causing harmful interference to SPASUR operations, LPRS are nonetheless permitted to operate within the SPASUR protection radii without requiring individual station licenses.<sup>506</sup> We believe that this approach is especially viable in this instance, given that LPRS operates at a maximum transmitter output power of 100 milliwatts<sup>507</sup> and thus poses little threat of interference to SPASUR.<sup>508</sup> We received no comment on this issue.

<sup>500</sup> This applies to both existing and future radiosondes.

<sup>501</sup> CORF Comments at 6.

<sup>502</sup> *Id.* at 1.

<sup>503</sup> *Id.* at 6.

<sup>504</sup> *Id.* at Attachment A.

<sup>505</sup> See *Service Rules Notice*, 17 FCC Rcd at 2544 ¶ 124.

<sup>506</sup> See *Service Rules Notice*, 17 FCC Rcd at 2544 ¶ 124.

<sup>507</sup> 47 C.F.R. § 95.639(e).

<sup>508</sup> *Id.*

**b. Fixed and Mobile Sites**

161. Background. In the *Service Rules Notice*, we proposed a method to coordinate fixed and mobile operations within the protection zone of a Government incumbent and elaborated on how the process would work for site-by-site licensees and geographic area licensees.<sup>509</sup> We received no comment on either of these issues, and for the reasons stated below we are adopting our proposals in the *Service Rules Notice*.

162. Discussion. For services assigned on a site-by site basis, the Commission will review all ULS applications to determine if the operation is located within the protection radii of a co-primary Government incumbent. If we determine that the operation is located within the protection radii of a co-primary Government incumbent, then the Commission will refer the application to the FAS as described in the *Reallocation Report and Order*.<sup>510</sup>

163. Unlike services licensed on a site-by-site basis, services licensed on a geographic area basis will not be required to file an application for each individual operation. Geographic area licensees, as prescribed by service-specific technical parameters, operate throughout their area of operation without needing prior consent of the Commission for each individual station. Taking into consideration this distinction, geographic licensees, by virtue of the nature of their operations, will be responsible for making a determination of whether a particular operation requires FAS approval on a case-by-case basis. Upon making such a determination, we will require the geographic area licensee to file an application through ULS, requesting FAS coordination of any fixed station located within the protection radii of a co-primary Government incumbent or any mobile unit which would operate within the protection radii of the co-primary Government incumbent. When an application requesting FAS coordination is received, the Commission will forward the relevant data to FAS for comment. If no objections are received within a specified time period, the Commission will grant the application if it is otherwise acceptable. FAS coordination will be required prior to activation of any fixed or mobile station within the co-primary Government incumbent's protection radii.

**3. Greenbelt, Maryland METSAT Station**

164. Background. In the *Service Rules Notice*, we addressed coordination procedures relevant to licensees in the 1670-1675 MHz band operating near the METSAT station located at Greenbelt, MD.<sup>511</sup> We indicated that the Greenbelt, MD facility serves as a back-up to the Wallops Island, VA facility and is therefore inactive most of the time.<sup>512</sup> We noted that the facility is operational for testing purposes approximately once per month.<sup>513</sup> We indicated that NTIA proposed a 65-kilometer protection radii around the Greenbelt, MD facility.<sup>514</sup> We sought comment on the protection radii.<sup>515</sup> Further, we proposed to require all fixed and mobile licensees to coordinate operations within the NTIA protection radii.<sup>516</sup> Under this proposal, we envisioned that coordination would take place before the activation of

<sup>509</sup> See *Service Rules Notice*, 17 FCC Rcd at 2545-46 ¶¶ 126-129.

<sup>510</sup> See *Reallocation Report and Order*, 17 FCC Rcd at 399-400 ¶ 73.

<sup>511</sup> See *Service Rules Notice*, 17 FCC Rcd at 2546-47 ¶¶ 130-134.

<sup>512</sup> *Id.* at 2546 ¶ 130.

<sup>513</sup> *Id.*

<sup>514</sup> *Id.* at 2546 ¶ 131.

<sup>515</sup> *Id.*

<sup>516</sup> *Id.*

new facilities or any modifications to existing facilities. We indicated that we believed that the coordination procedures established for the METSAT facilities located at Wallops Island, VA and Fairbanks, AK would also suffice for the Greenbelt, MD facility.<sup>517</sup> Finally, we noted that protection of the Greenbelt, MD site is necessary only while the station is in operation.<sup>518</sup> Therefore, we proposed that the 1670-1675 MHz licensee would be required to reduce power or shut down any fixed site or mobile unit located within the coordination zone and which could cause interference to the Greenbelt, MD facility, when the Greenbelt, MD facility is active.<sup>519</sup>

165. Discussion. Protection Radii. We believe that the 65-kilometers protection radius approach is appropriate because licensees in the 1670-1675 MHz band have the flexibility to operate fixed sites up to a maximum power of 2000 watts EIRP. InsideTrax does not believe that a 65-kilometers radius of protection around the Greenbelt, MD site is necessary.<sup>520</sup> InsideTrax states that protection radius should take into account the nature of the transmitters, rather than setting a single limit.<sup>521</sup> InsideTrax believes that a 16-kilometer zone may be more appropriate for low-power, low duty-cycle devices.<sup>522</sup> We note, however, that the 65-kilometer radius will provide the Greenbelt, MD facility protection from both high powered and low powered operation. Further, the 65-kilometer radius is a protection zone rather than an exclusion zone, thus providing the 1670-1675 MHz licensee with greater flexibility and regulatory certainty to coordinate operation within the 65-kilometer radius than would be provided by a protection zone determined by the type of transmitters deployed.

166. Coordination of Fixed and Mobile. We received no comments opposed to our proposal to coordinate all fixed and mobile sites. Consequently, we will implement our plan to require all fixed and mobile licensees operating in the 1670-1675 MHz band to coordinate operations within the NTIA protection radii. As we indicated in the *Service Rules Notice*, under this proposed plan, coordination would take place before the activation of new facilities or any modifications to existing facilities. As we indicated in a previous section, coordination of multiple fixed sites and mobile units may be performed via a single application.

167. Coordination Procedures. Based on the record before us, we will implement the same coordination procedures for Greenbelt, MD that were established in the *Reallocation Report and Order* for Wallops Island, VA and Fairbanks, AK.<sup>523</sup> These procedures are listed in Section 1.924(f).<sup>524</sup> We believe these procedures are appropriate because they offer the 1670-1675 MHz licensee maximum flexibility. Section 1.924(f) requires the 1670-1675 MHz licensee to notify the National Oceanic and Atmospheric Administration (NOAA) of operations that require coordination.<sup>525</sup> The 1670-1675 MHz licensee must then file an application with the Commission requesting an individual station license.<sup>526</sup> The Commission allows a 20-day period for objections to be filed.

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<sup>517</sup> *Id.* at 2546 ¶ 132.

<sup>518</sup> *Id.* at 2546 ¶ 133.

<sup>519</sup> *Id.*

<sup>520</sup> InsideTrax Comments at 13.

<sup>521</sup> *Id.*

<sup>522</sup> *Id.*

<sup>523</sup> See *Reallocations Report and Order*, 17 FCC Rcd at 399-400 ¶ 73.

<sup>524</sup> 47 C.F.R. § 1.924(f).

<sup>525</sup> *Id.*

<sup>526</sup> See discussion *supra* Section IV.B.7.

168. We believe that maximum flexibility is needed with coordination because we do not know what kind of technology will eventually be employed in this band. We note that each commenter who discusses the 1670-1675 MHz band proposes a different technology.<sup>527</sup> We also note that each commenter proposes a different method to protect Greenbelt, MD facility from harmful interference.<sup>528</sup> Under the procedures described above the eventual licensee will be able to negotiate directly with NOAA to establish protection. Consequently, we will decline to adopt ArrayComm's additional refinements to the coordination procedure.

169. ArrayComm states that the coordination procedures for established for Wallops Island, VA and Fairbanks, AK are applicable to the Greenbelt, MD facility, provided that additional refinements to the coordination procedures are adopted.<sup>529</sup> Specifically, ArrayComm proposes a coordination procedure whereby, prior to operation of any site within the protection radii, the 1670-1675 MHz licensee would prepare a plan or model, based on a generally accepted cellular planning tool, of all proposed base stations and mobile units.<sup>530</sup> The results of this modeling plan would be submitted to NOAA prior to operation for verification and testing at the Greenbelt, MD facility.<sup>531</sup> The Government operator would then have 30 days to complete and verify the measurements.<sup>532</sup> Under ArrayComm's proposal, the Government operator would also notify the 1670-1675 MHz licensee within 30 days of any scheduled Government operation at the Greenbelt, MD facility.<sup>533</sup> Additionally, in the event that the Greenbelt, MD facility is activated unexpectedly, the ArrayComm proposal would require the Government operator to alert the 1670-1675 MHz licensee. In those instances where the facility is activated unexpectedly, ArrayComm suggests that the 1670-1675 MHz licensee be afforded 120 minutes to transition to a mode where protection is provided to the Greenbelt, MD facility.<sup>534</sup>

170. We believe that the coordination procedures put forth by ArrayComm would limit a licensee's flexibility to negotiate alternative methods for protection.<sup>535</sup> While we decline to incorporate ArrayComm's suggestion, we note that under the procedures adopted here the 1670-1675 MHz licensee is free to negotiate any procedures with NOAA. AeroAstro states that they accept the need to undertake coordination prior to operation in the 1670-1675 MHz band.<sup>536</sup> AeroAstro states that they will work with NOAA to reduce coordination zones around METSAT facilities.<sup>537</sup> In addition, AeroAstro states that

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<sup>527</sup> See, e.g., ArrayComm Comments; InsideTrax Comments; AeroAstro Comments.

<sup>528</sup> InsideTrax Comments at 13 (requesting a 16 kilometer coordination zone for low-power devices), AeroAstro Comments at 9-10 (proposing a scheme in lieu of coordination whereby transmitters automatically cease operation within coordination zone), ArrayComm Comments at 35 (supporting coordination based on generally accepted cellular planning tool.)

<sup>529</sup> ArrayComm Comments at 35.

<sup>530</sup> See attachment to *Ex Parte* Letter from Randall S. Coleman, ArrayComm, to Magalie Roman Salas, Secretary, Federal Communications Commission, dated December 21, 2001.

<sup>531</sup> *Id.* at 3-4.

<sup>532</sup> *Id.*

<sup>533</sup> *Id.* at 3.

<sup>534</sup> *Id.* at 2.

<sup>535</sup> See InsideTrax Reply Comments at 11 (advocating a more progressive rule based on the output power of the licensed service).

<sup>536</sup> AeroAstro Comments at 9.

<sup>537</sup> *Id.* at 10.

they may propose a scheme in lieu of coordination whereby transmitters automatically cease operation within coordination zones.<sup>538</sup>

171. *Protection needed when active.* The Greenbelt, MD facility serves as a back up to the Wallops Island, VA facility and is therefore inactive most of the time. This facility is operational for testing purposes approximately once per month. ArrayComm states that protection should be afforded to the Greenbelt, MD facility only during the periods when it is in use.<sup>539</sup> In addition, ArrayComm believes that commercial operation in the vicinity should otherwise be allowed to exceed special protection criteria.<sup>540</sup> We agree with ArrayComm and we will indicate in our rules that protection of the Greenbelt, MD facility is necessary only while the station is in operation. Therefore, as we proposed in the *Service Rules Notice*, 1670-1675 MHz licensee will be required to reduce power or shut down any fixed site or mobile unit located within the coordination zone and which could cause interference to the Greenbelt, MD facility, only when the Greenbelt, MD facility is active. Conversely, when this facility is inactive, the 1670-1675 MHz licensee will be permitted to operate fixed and mobile units that exceed the designated protection criteria without prior coordination. We believe that these procedures strike an appropriate balance that both supports existing Government operations and promotes the opportunity for new licensees to offer services in this band to the Washington, DC-Baltimore, MD metropolitan areas.

#### 4. Flight Test Telemetry

172. *Background.* In the *Reallocation Report and Order*, we indicated that new entrants to the 2385-2390 MHz band would need to protect nine non-Governmental aeronautical flight test sites until 2007.<sup>541</sup> Accordingly, we sought comment on the best method for coordinating operations between licensees in the 2385-2390 MHz band and incumbent non-Government aeronautical flight test telemetry operations.<sup>542</sup> The nine non-Governmental aeronautical flight test sites for which we established protection radii are listed in footnote US363 of Section 2.106 of our Rules.<sup>543</sup>

173. We proposed a procedure to require operations in the 2385-2390 MHz band to be coordinated with the Aerospace and Flight Test Radio Coordinating Council (AFTRCC).<sup>544</sup> Under this proposal, licensees in the 2385-2390 MHz band would be required to coordinate fixed and mobile operations within the protection radii of the non-Government aeronautical flight test sites listed in footnote US363 of Section 2.106.<sup>545</sup> We proposed that upon receipt of the 2385-2390 MHz licensee's filing of its application, including all pertinent technical information regarding the proposed operation via the ULS, we would refer the application to AFTRCC for coordination.<sup>546</sup> Only upon AFTRCC approval of the application would we then issue an individual station license for the application referred to AFTRCC.

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<sup>538</sup> *Id.*

<sup>539</sup> ArrayComm Comments at 35.

<sup>540</sup> *Id.*

<sup>541</sup> *Reallocation Report and Order*, 17 FCC Rcd at 399 ¶ 71.

<sup>542</sup> See *Service Rules Notice*, 17 FCC Rcd at 2547 ¶ 137.

<sup>543</sup> 47 C.F.R. § 2.106, footnote US363.

<sup>544</sup> See *Service Rules Notice*, 17 FCC Rcd at 2548 ¶ 138. AFTRCC is an association of aerospace companies engaged in the design, development, manufacturing and testing of commercial and military aircraft, space vehicles, missiles and weapons systems. AFTRCC Comments at 2.

<sup>545</sup> *Id.*

<sup>546</sup> *Id.*



174. Discussion. We are adopting our proposal in general, with a slight modification as proposed by AFTRCC because this approach will facilitate a more streamlined processing mechanism than the approach we proposed in the *Service Rules Notice*.<sup>547</sup> Thus, under the coordination procedures we are adopting here, prospective operators will contact AFTRCC to secure a frequency recommendation prior to filing an application with the Commission.<sup>548</sup> We believe that this approach is consistent with existing procedures and facilitates the resolution of potential interference problems before an application is formally filed.<sup>549</sup> According, we will require licensees in the 2185-2390 MHz band to receive AFTRCC approval before filing an application via the ULS.<sup>550</sup>

175. Thus, under the coordination rules we adopt herein, licensee in the 2385-2390 MHz band will be required to coordinate fixed and mobile operations within the protection radii of the non-Government aeronautical flight test sites listed in footnote US363 of Section 2.106 of our rules. An individual station license will be issued for each coordinated operation. Further, licensees will need to obtain approval from AFTRCC prior to filing an application for an individual station license via the ULS. Applications filed in our ULS should contain all relevant technical information regarding the proposed operation. Additionally, all applications requiring AFTRCC approval must contain a statement that AFTRCC approval was obtained.

176. On a separate but related issue, AFTRCC expresses concern that out-of-band emissions from the 1432-1435 MHz band could affect upper adjacent-band flight test operations in the 1435-1525 MHz band and that out-of-band emissions from the 2385-2390 MHz band could effect lower adjacent-band flight test operations in the 2360-2390 MHz band.<sup>551</sup> To limit adjacent-band interference, AFTRCC suggest that we also require licensees in the 1432-1435 MHz and 2385-2390 MHz bands to coordinate their operations within the protection radii of the non-Government aeronautical flight test sites listed in footnote US363 of Section 2.106.<sup>552</sup> AFTRCC suggests that the basis for coordination be determined by power flux density limits at the receiver site of the flight test telemetry operation.<sup>553</sup>

177. Although we recognize the importance of aeronautical flight test telemetry, we believe that imposing AFTRCC's coordination requirements on licensees in the 1432-1435 MHz and 2385-2390 MHz bands would be onerous and potentially harmful to the viability of operations in these bands overall. Because we believe that the existing coordination procedures, which require coordination of in-band 2385-2390 MHz operations within 160 kilometers (100 miles) of each flight test site, is adequate protection, we will decline to incorporate AFTRCC's instant adjacent-band coordination proposal. Rather, we believe that the more appropriate approach is to afford aeronautical flight test telemetry operations protections from adjacent-band interference only to the extent that such radiation exceeds the limits on out-of-band emissions established for that service. Because there are a limited number of sites where aeronautical flight test operations may arise, we believe that such operations can be accommodated on a case-by-case basis.

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<sup>547</sup> AFTRCC Comments at 6-8.

<sup>548</sup> *Id.* at 7.

<sup>549</sup> *Id.*

<sup>550</sup> *See id.* at 7-8.

<sup>551</sup> *Id.* at 5.

<sup>552</sup> *Id.* at 5.

<sup>553</sup> *Id.*

## 5. Canada and Mexico Coordination

178. In the *Service Rules Notice*, we proposed certain interim requirements for terrestrial licenses along Mexico and Canada borders. We stated that the U.S. currently does not have agreements with Canada and Mexico covering the paired 1392-1395 MHz and 1432-1435 MHz bands or the unpaired 216-220 MHz, 1390-1392 MHz, 1427-1432 MHz, 1670-1675 MHz and 2385-2390 MHz bands.<sup>554</sup> We tentatively concluded that until such time as agreements are completed, licensees should operate at specific emission levels at the border.<sup>555</sup>

179. After careful consideration, we have decided to decline adoption of an emission limit at the border. Rather, in order to provide the most flexibility to licensees near the border areas, we have decided that "near the border" licensees must protect stations in Canada and Mexico from harmful interference. This will permit licensees to maximize their operations depending on the spectrum use, terrain, and other factors at the border areas, while still protecting operations across the border. We note, however, that operation in the paired 1392-1395 MHz and 1432-1435 MHz bands and the unpaired 216-220 MHz, 1390-1392 MHz, 1427-1432 MHz, 1670-1675 MHz and 2385-2390 MHz bands may be subject to future agreements with Canada and Mexico and therefore may be subject to further modification.

### F. Other Proposals

#### 1. 216-220 MHz Band

##### a. Data Flow

180. Background. In the *Service Rules Notice*, we sought comment on Data Flow's Petition requesting that the Commission amend Sections 90.35 and 90.259 of the Commission's Rules.<sup>556</sup> Specifically, Data Flow requests that the "Class of Stations" column for frequency band 216-220 of the Industrial/Business Pool Frequency Table in Section 90.35, be amended from "Base or mobile" to "Fixed, base, or mobile."<sup>557</sup> Data Flow Systems also requests that Section 90.259 be amended to substitute the word "shall" for "may" to read as follows: "Base stations authorized in these bands *may* be used to perform telecommand functions with associated mobile telemetering stations."<sup>558</sup>

181. Discussion. We take this opportunity to rectify the apparent uncertainty here by amending Section 90.35(b) of our rules to permit secondary telemetry operators the flexibility to utilize

<sup>554</sup> The 216-220 MHz band is currently covered in an agreement with Canada for operations above 30 MHz. This agreement, though, applies only to Fixed Installation Radars in the 216-220 MHz band and would therefore not be applicable to the current planned use. A separate agreement will have to be negotiated for non-radar uses. See USA: *Treaties and Other International Acts Series* (TIAS) 5205; CAN: *Canada Treaty Series* (CTS) 1962 No. 15. *Agreement Between the United States of America and Canada Revising the Technical Annex to the Agreement of October 24, 1962* (TIAS 5205/CTS 1962 No. 15), Effected by Exchange of Notes at Ottawa, Canada, June 16 and 24, 1965. Entered into force June 24, 1965. USA: TIAS 5833/CAN: CTS 1962 No. 15, as amended June 24, 1965.

<sup>555</sup> See ArrayComm Comments at 33. ArrayComm believes that the 47 dBuV/m field strength limit for the 1670-1675 MHz band would provide adequate protection for a wide range of co-channel commercial services in Canada and Mexico.

<sup>556</sup> *Data Flow Petition* at 3. Data Flow is a Florida corporation that manufactures and sells Supervisory Control and Data Acquisition (SCADA) telemetry systems to public and private water utility companies throughout the United States. *Id.*

<sup>557</sup> *Id.* See 47 C.F.R. § 90.35.

<sup>558</sup> 47 C.F.R. § 90.259 (emphasis added).

this band. Accordingly, we grant Data Flow's petition, in part, and hereby amend section 90.35(b) to include fixed uses in the 217-220 MHz band. We also deny, in part, Data Flow's request with regard to the 216-217 MHz portion of the band. Because we reallocated the 216-217 MHz portion of the band to LPRS, we will not grant new licenses in this portion of the band.<sup>559</sup> We believe that the changes we adopt here will enhance the use of the 217-220 MHz band for radio services provided by utilities and pipeline companies.<sup>560</sup> We further believe that these amendments will remove any uncertainty regarding whether fixed telemetry can operate in the 217-220 MHz portion of the band under the Commission's rules.<sup>561</sup>

182. Mobex opposes Data Flow's proposed amendments. Mobex, citing a 1971 Commission rulemaking, states that historically, the Commission has made no provision for fixed uses in this band.<sup>562</sup> We note, however, that the circumstances surrounding the use of this band since our 1971 rulemaking have not remained static. Other than SPASUR, since 1971, the Federal Government has ceased to use this band for high-powered radiolocation. Additionally, in light of this band's reallocation to non-Federal Government use and growing congestion and scarcity of spectrum that provide important public utility services, we believe that Data Flow's petition is both timely and relevant to this proceeding. Both the technological capabilities as well as the applicable scope of telemetering services throughout this band have matured significantly.

183. PSI believes that if the Commission grants Data Flow's request, it should also adopt coordination requirements for fixed telemetry operations that mirror those requirements adopted for secondary amateur stations under section 97.303(e) of our rules.<sup>563</sup> We disagree. We do not currently require mobile telemetry operations in the band to follow such stringent coordination requirements, and we find no reason to adopt such requirements here. Rather, we believe that frequency coordination under Section 90.175 of our rules, coupled with a requirement on the fixed telemetry operator to notify the geographic area licensee, is more than adequate to protect primary operations in the band.

184. In response to the *Service Rules Notice*, Data Flow also submits a new request, separate and apart, from its initial petition for rulemaking. In its latest filings to this proceeding, Data Flow requests that water utility telemetry be limited to the 217-220 MHz band and that it correspondingly be upgraded from secondary to primary.<sup>564</sup> Data Flow points out that water utility companies utilize fixed telemetry to ensure safe drinking water for the public and to protect the environment from contaminated runoff.<sup>565</sup> Data Flow contends that because of the dearth of satisfactory channels available in the 150-174 MHz or 450-470 MHz bands, water utility companies have needed to use the 216-220 MHz band for

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<sup>559</sup> In the *Reallocation Report and Order*, we recognized the important functions LPRS provides to the public. Accordingly, in allocating the 216-217 MHz to LPRS, we decided to cease licensing new non-LPRS in this band on either a primary or secondary basis so as to afford LPRS maximum protection from harmful interference, without having to impose additional technical or regulatory restrictions. *Reallocation Report and Order*, 17 FCC Rcd at 380 ¶ 26.

<sup>560</sup> See UTC Comments at 3 (permitting fixed telemetry in this band would provide necessary spectrum to facilitate the deployment and use of critical services provided by utilities and pipeline companies).

<sup>561</sup> See Itron Comments at 10 (stating that Section 90.35, as it currently reads, arguably precludes fixed telemetry, and further, that there is no basis to prohibit fixed telemetry in a band in which mobile telemetry is permitted).

<sup>562</sup> Mobex Comments at 2.

<sup>563</sup> PSI Comments at 5.

<sup>564</sup> Data Flow Comments at 4. On this point, we note that one other commenter agreed with Data Flow's position that telemetry ought to be elevated to primary status. See Watchman Comments at 3.

<sup>565</sup> Data Flow Comments at 1, 3.

fixed telemetry purposes.<sup>566</sup> Data Flow cites to previous waiver grants allowing water utility companies to operate fixed telemetry in the 216-220 MHz band.<sup>567</sup>

185. PSI opposes Data Flow on this point. PSI opposes new licensing of primary telemetry in the 217-218 MHz and 219-220 MHz "AMTS bands" and proposes that secondary telemetry be "confined to the under utilized 218-219 MHz band."<sup>568</sup> Fairfield believes that Data Flow's new request and PSI's proposal to limit telemetry to the 218-219 MHz band are both procedurally deficient.<sup>569</sup> Fairfield also points out that as a matter of policy as well as procedure, a grant of either proposal would have the effect of limiting critical geophysical telemetry operations throughout the band.<sup>570</sup>

186. The parties raise comments that serve to underscore anecdotally our position regarding the importance of a spectrum use management approach that promotes efficiency as well as diversity. As Watchman states, "reliable telemetry is needed ... [but] water utilities are not the only important users in the band . . . ."<sup>571</sup> In considering the claims of the parties, we must be mindful of the circumstances surrounding the current and prospective uses of this band. In assessing the proposals before us, we find no basis to change our approach to this band. To adopt either PSI's proposal or Data Flow's latest request would require us to at least revisit and potentially alter the existing framework for the 216-220 MHz band. We also note that neither PSI nor Data Flow is precluded from promoting their interests in the band as either a participant in future auctions of this band or as a principal in a contractual arrangement with primary licensees in this band. We therefore decline to entertain either PSI's proposal to limit telemetry to the "218-219" MHz band or Data Flow's latest request to elevate secondary water telemetry to primary throughout the 217-220 MHz band.

#### b. Securicor

187. Background. In its comments to the *Reallocation Notice*, Securicor sought to license "white space" in the 216-220 MHz band under a paradigm similar to the 220-222 MHz band (220 MHz Service).<sup>572</sup> Securicor states that expansion of the spectrally-efficient technology of the 220 MHz service to the 216-220 MHz band would allow greater use of the limited amount of unencumbered spectrum.<sup>573</sup> In the *Reallocation Report and Order*, we declined Securicor's request with respect to the 216-217 MHz portion of the band because of the need to protect LPRS operations.<sup>574</sup> We now address Securicor's request as it relates to the remaining portion of the 216-220 MHz band.<sup>575</sup> Specifically, in the *Service Rules Notice*, we sought comment on whether there are efficiencies to be gained by implementing Securicor's proposal because of the adjacent 220-222 MHz Service.<sup>576</sup>

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<sup>566</sup> *Id.* at 3.

<sup>567</sup> *Id.* at 3-4.

<sup>568</sup> PSI Comments at 5.

<sup>569</sup> Fairfield Reply Comments at 3.

<sup>570</sup> *Id.* at 3-6.

<sup>571</sup> Watchman Comments at 3.

<sup>572</sup> See Securicor Comments at 5. Securicor is a service provider in the 220 MHz Service.

<sup>573</sup> *Id.* at 5.

<sup>574</sup> See *Reallocation Report and Order*, 17 FCC Rcd at 384 ¶ 35.

<sup>575</sup> *Id.*

<sup>576</sup> *Service Rules Notice*, 17 FCC Rcd at 2521 ¶ 49. According to Warren Havens, Securicor no longer manufactures and markets 5 kHz equipment. Warren Havens Late-Filed Comments at 4. Notwithstanding the current operating

188. Discussion. Because we believe that it would be premature to implement a new licensing scheme for this band at this time, we deny Securicor's request. While we recognize that this band is heavily encumbered thus lending support to Securicor's position,<sup>577</sup> we do not believe that an implementation of Securicor's proposal would be prudent.<sup>578</sup> As we mentioned earlier in this proceeding, the balance of the 217-220 MHz band is either already subject to competitive bidding (218-219 MHz) or proposed to be assigned by competitive bidding (AMTS).<sup>579</sup> Datex/UST asserts that Securicor's proposal would subject the "white areas" in this band to competitive bidding on a geographic area basis that, in turn, would cause "significant harm to the nascent 218-219 MHz Service."<sup>580</sup> In this connection, we note that prospective parties interested in utilizing this band to implement a particular business plan are not foreclosed from doing so should they elect to participate in and ultimately win a license at auction in either of these bands.<sup>581</sup>

c. **Warren Havens**

189. Background. In comments filed in response to the *Reallocation Notice*, Warren Havens requests the Commission to authorize "advanced technologies services" in the 216-225 MHz band which would be governed under a corollary set of service rules.<sup>582</sup> Havens suggests that new "advanced technologies services" could include a National Environmental Wireless Service (NEWS) for environmental and wildlife monitoring, or 4<sup>th</sup> generation wireless technologies.<sup>583</sup> In the *Reallocation Report and Order*, we declined to make changes to the 216-217 MHz portion of the band in order to protect LPRS operations.<sup>584</sup> Nonetheless, in the *Reallocation Report and Order*, we deferred action on Havens' request as it relates to the remaining portion of the 216-220 MHz band.<sup>585</sup> We now turn our attention to Havens' proposal as it relates to the remaining portion of the 216-220 MHz band.<sup>586</sup>

(...continued from previous page)

status of Securicor's business, the issue raised by Securicor is far from settled. We believe that this issue, having been brought properly before the Commission, and given the issue's relevancy to the instant proceeding as evidenced by the record, is not moot as Warren Havens contends.

<sup>577</sup> The SMR Advisory Group, LC and BIZCOM USA, Inc., (collectively, "SMR/BIZCOM") filed joint reply comments in support of Securicor's general position.

<sup>578</sup> See, e.g., PSI Comments at 3 (stating that the Securicor plan provides no reason to support a remodeling of the 216-220 MHz band similar to the 220-222 MHz band). But see SMR/BIZCOM Reply Comments at 8 (claiming that Securicor's 5 kHz narrowband technology would enhance compatibility between the 218-220 MHz and 220-222 MHz bands). SMR/BIZCOM believes that the Commission should restructure the 218-220 MHz band similar to the 220-222 MHz band to enhance spectrum efficiency and to promote the variety of services that could be offered. *Id.* at 7-8.

<sup>579</sup> See *supra* ¶ 37.

<sup>580</sup> See Datex/UST Comments at 3 (stating that incumbent operators, who raised operating capital and created business plans in reliance on uniform spectrum rules for the 218-219 MHz band, would suffer serious setbacks). In its joint filing UST and Datex indicate that they have already constructed systems and initiated operations in the Baton Rouge and Bakersfield markets, with plans for more. *Id.*

<sup>581</sup> See e.g., Mobex Comments at 5.

<sup>582</sup> See Havens Comments at 3. Havens holds AMTS authorizations to serve five inland navigable waterways and also holds licenses in the 220-222 MHz service.

<sup>583</sup> *Id.* at 4-8.

<sup>584</sup> See *Reallocation Report and Order*, 17 FCC Rcd at 384 ¶ 35.

<sup>585</sup> *Id.*

<sup>586</sup> *Id.*

190. Discussion. The majority of comments oppose Havens' petition as overly broad and speculative.<sup>587</sup> Havens proposes to use this band for environmental and wildlife monitoring. Though laudable, we are not persuaded that this proposal would be feasible primarily because of significant incumbent use of the 217-220 MHz band, especially in light of the Commission's reallocation of the lower portion of this band to LPRS on a primary basis. Further, Havens would have the Commission postpone any plans to assign licenses in this rulemaking, at the expense of existing and prospective licenses, so that it can submit a proposed rulemaking to promulgate its advanced technologies services concept. We fail to see how Havens' proposal promotes the public interest with regard to our spectrum management goals and the immediate goals of this instant rulemaking. Lastly, we note that no Commission rule would prohibit the type of service Havens proposes. Havens, as well as current and prospective AMTS or 218-219 licensees have the opportunity to offer any type of acceptable service in this band through the competitive bidding process. Accordingly, we deny Havens' proposal to designate the 216-225 MHz band as an "advanced technologies services" band.

## 2. 1.4 GHz Band

191. In a proposed joint agreement (Joint Agreement), AHA and Itron present a band plan to facilitate the shared operations of WMTS and telemetry operations in the 1427-1429.5 MHz and 1429.5-1432 MHz bands.<sup>588</sup> In addition to proposing a band "flip" as part of the overall band plan,<sup>589</sup> the Joint Agreement, *inter alia*, outlines the terms between AHA and Itron governing telemetry operations throughout the band, including secondary usage as well as technical restrictions on telemetry to protect WMTS from harmful interference. AHA and Itron request that we codify the major elements of the Joint Agreement as part of the instant proceeding. We now address the major elements of the Joint Agreement with regard to secondary operations and technical restrictions.

### a. Secondary Operations

192. Itron urges the Commission to adopt that portion of the Joint Agreement with regard to secondary operations. Under the Joint Agreement, secondary operations would be permitted as follows: (i) telemetry would operate on a secondary basis in the lower portion of the band (1427-1429.5 MHz) where WMTS is primary, and (ii) WMTS would operate on a secondary basis in the upper portion of the band (1429.5-1432 MHz) where Part 90 telemetry is primary.<sup>590</sup> In the *Reallocation Report and Order*, we allocated telemetry on a secondary basis in the lower portion of the band (1427-1429.5 MHz) where WMTS is primary.<sup>591</sup> However, in that proceeding, we did not establish an allocation for WMTS in the upper portion of the band (1429.5-1432 MHz) where telemetry is primary.<sup>592</sup> We note, however, that because WMTS is a subset of telemetry, the existing allocation for telemetry in this band would allow WMTS to operate in the upper portion of the band (1429.5-1432 MHz) on a primary basis under the provisions of Part 90 of our Rules.<sup>593</sup> Because WMTS equipment is generally prohibited from operating

<sup>587</sup> See, e.g., Datex/UST Comments, Mobex Comments, SMR/BIZCOM Reply Comments.

<sup>588</sup> See Joint Agreement, *supra* note 84.

<sup>589</sup> See *supra* ¶¶ 27-28.

<sup>590</sup> Itron Comments at 9.

<sup>591</sup> See *Reallocation Report and Order*, 17 FCC Rcd at 392 ¶ 54.

<sup>592</sup> *Id.*

<sup>593</sup> 47 C.F.R. § 90.259.

on Part 90 frequencies,<sup>594</sup> in this limited instance, we will allow WMTS equipment to operate on Part 90 frequencies throughout the 1427-1429.5 MHz and 1429.5-1432 MHz bands.<sup>595</sup>

**b. Limitations on Telemetry**

193. In the *Service Rules Notice* we indicated that AHA provided several suggestions for restricting telemetry in these bands to protect WMTS from harmful interference.<sup>596</sup> Specifically, AHA proposed: 1) restricting telemetry operations to utility telemetry; 2) restricting telemetry operations to fixed telemetry; and/or 3) limiting the power levels of telemetry operations from 100 watts to 10 watts to 1 watt as frequencies approach where WMTS operations are primary (1427-1429.5 MHz).<sup>597</sup> In their Joint Agreement, AHA and Itron also propose to limit the field strength telemetry may radiate – into the WMTS band – at the site of any WMTS operations. We discuss each of these issues as follows.

**(i) Utility use**

194. AHA, Itron, UTC, and Hexagram all endorse limiting telemetry at 1.4 GHz for utility use only.<sup>598</sup> In support, Itron points to the Joint Agreement, which specifies utility telemetry as a form of telemetry that is wholly compatible with WMTS operations.<sup>599</sup> AHA states that comments in this proceeding demonstrate that wireless utility telemetry services are more compatible with WMTS.<sup>600</sup> In the *Service Rules Notice*, however, we specifically asked commenters who support limiting telemetry in these bands to utility-specific operations to explain whether other forms of telemetry operations (*i.e.*, non-utility) would cause harmful interference to WMTS.<sup>601</sup> Although several commenters generally cite their support for utility use only, no commenter clearly explains how or whether non-utility telemetry operations would cause harmful interference to WMTS. Given the record in this proceeding, we believe that telemetry interference to WMTS is better addressed by establishing technical parameters to minimize interference that will apply to all forms of telemetry, rather than prohibiting non-telemetry. Accordingly, we decline to limit telemetry in these bands to utility use only.

**(ii) Fixed vs. Mobile Operation**

195. Since telemetry operating within the WMTS primary band poses the greatest threat of interference, we agree with AHA that secondary telemetry should be limited to fixed operation only.<sup>602</sup> We believe that in the absence of conclusive empirical data on the levels of interference,<sup>603</sup> fixed only

<sup>594</sup> 47 C.F.R. § 90.203.

<sup>595</sup> See also discussion at *infra* ¶¶ 27-28.

<sup>596</sup> See *Service Rules Notice*, 17 FCC Rcd at 2523 ¶ 56.

<sup>597</sup> *Id.*

<sup>598</sup> See AHA Reply Comments at 1-2, Itron Comments at 2, UTC Comments at 6, Hexagram Comments at 3-4.

<sup>599</sup> Itron at 2

<sup>600</sup> AHA Comments at 2.

<sup>601</sup> See *Service Rules Notice*, 17 FCC Rcd at 2523 ¶ 56.

<sup>602</sup> This limitation to allow only fixed telemetry will apply to secondary telemetry outside the seven geographic “carve-out” areas in the 1427-1429.5 MHz band and to secondary telemetry within the seven geographic “carve-out” areas in the 1429.5-1432 MHz band. See AHA Comments at 5.

<sup>603</sup> See General Electric Comments at 2-3.

operations for secondary telemetry will help to identify, isolate and resolve interference conflicts quickly.<sup>604</sup>

196. Unlike co-channel operations, we believe that the potential for harmful interference to WMTS arising from primary telemetry operations in the adjacent band is minimal. Therefore, we decline to prohibit mobile operations for primary telemetry. Primary telemetry will be authorized for fixed, base or mobile operations.<sup>605</sup> Licensees will be required to specify their mobile area of operations as a radius around a fixed point.<sup>606</sup> Although we decline to prohibit mobile operations for primary telemetry, we nonetheless impose other technical restrictions, such as field strength limits, to provide protection to WMTS operations from harmful interference. This issue is discussed below.

### (iii) Power Limitations

197. *Fixed Sites:* The Joint Agreement proposes a sliding scale power limitation on fixed telemetry as the transmit frequency approaches the WMTS primary band.<sup>607</sup> Specifically, AHA and Itron would limit the power of fixed telemetry from 100 watts to 10 watts to 1 watt as the frequency approaches the WMTS band.<sup>608</sup> Based on the record before us, we will adopt the sliding scale power restriction on fixed telemetry proposed by AHA and Itron.<sup>609</sup> Commenters generally support the sliding scale power limitation although one commenter supports an even stricter limitation on power for telemetry.<sup>610</sup> We are concerned that stricter power limits may limit the viability of telemetry operations in this band. We believe that the limits proposed by AHA and Itron strike the proper balance between minimizing the possibility of harmful interference to adjacent-band WMTS operations and allowing viable telemetry operations.

198. Specifically, the maximum EIRP for secondary fixed telemetry will be 1 watt in the 1427-1429.5 MHz band. The maximum EIRP for primary fixed telemetry will be limited by frequency as follows (1) 1 watt for 1429.5-1430.5 MHz; (2) 10 watts for 1430.5-1431.5 MHz and (3) 100 watts for 1431.5-1432 MHz. In the "carve-out" areas,<sup>611</sup> the maximum EIRP for secondary fixed telemetry will be 1 watt in the 1429-1431.5 MHz band. For primary telemetry in the "carve-out" areas, the maximum EIRP will be limited by frequency as follows (1) 100 watts for 1427-1428 MHz; (2) 10 watts for 1428-1428.5 MHz; (3) 1 watt for 1428.5-1429 MHz and (4) 1 watt for 1431.5-1432 MHz.<sup>612</sup>

<sup>604</sup> AHA Comments at 3. *But see* Itron Comments at 3-4 (stating that mobile authority should be confined to utility entities holding a fixed telemetry license).

<sup>605</sup> Fixed, base or mobile telemetry will be authorized for primary telemetry outside the seven geographic "carve-out" areas in the 1429.5-1432 MHz band and for primary telemetry within the seven geographic "carve-out" areas in the 1427-1429.5 MHz band.

<sup>606</sup> *See supra* ¶ 50.

<sup>607</sup> Joint Agreement at 4.

<sup>608</sup> *Id.*

<sup>609</sup> We will also adopt the sliding scale power limit for fixed telemetry operations in the seven geographic "carve-out" areas.

<sup>610</sup> *See* Itron Comments at 2 and General Electric Reply Comments at 2 (supporting the AHA-Itron sliding scale power limitation), UTC Comments at 12 (suggesting a slightly modified sliding scale power limitation). *But see* Hexagram Reply Comments at 5 (supporting a more strict power limitation).

<sup>611</sup> *See* note 85, *infra*.

<sup>612</sup> We note that the Joint Agreement contemplates a 10-watt maximum EIRP for operations at 1431.5-1432 MHz. This 10-watt maximum limit, however, would be inconsistent with the intent of the sliding scale power limitation (continued....)



199. In addition, we will limit “temporary fixed” sites to a maximum EIRP of 1 watt on any frequency.<sup>613</sup> Because licensees will not be providing the specific coordinates of “temporary fixed” sites, we believe that these sites should be limited to the lowest power on the sliding scale to minimize the possibility of harmful interference to adjacent-band WMTS operations.

200. *Mobile Units:* Itron proposes a sliding scale power limitation for mobile telemetry as the transmit frequency approaches the WMTS primary band.<sup>614</sup> Specifically, Itron would limit the power of mobile telemetry from 1 watt to 25 milliwatts as the frequency approaches the WMTS band.<sup>615</sup> We believe that the sliding scale limit on mobile units proposed by Itron strikes the proper balance between minimizing the possibility of harmful interference to adjacent-band WMTS operations and allowing viable mobile telemetry operations. Therefore, we will adopt Itron’s sliding scale power limitation for mobile operations.

201. Specifically, the maximum EIRP for mobile telemetry will be limited by frequency as follows (1) 25 milliwatts for 1429.5-1430 MHz and (2) 1 watt for 1430-1432 MHz. In the “carve-out” areas, the maximum EIRP for mobile telemetry will be limited by frequency as follows (1) 1 watt for 1427-1428.5 MHz; (2) 25 milliwatts for 1428.5-1429 MHz and (3) 25 milliwatts for 1431.5-1432 MHz.<sup>616</sup>

202. AHA recommends that mobile telemetry operations be limited to an operating power no greater than 25 milliwatts in the non-WMTS portions of the 1427-1432 MHz band.<sup>617</sup> AHA believes that mobile operations restricted to no more than 25 milliwatts will limit adjacent-band and in-band interference to WMTS operations.<sup>618</sup> We believe, however, that such a strict power limitation will render mobile operations unusable for practical applications. Therefore, we decline to adopt AHA’s proposed limit of 25 milliwatts.

203. AHA indicates that an adjacent-band mobile unit operating at 1 watt EIRP would have to be located at least 226 feet from a WMTS facility in order to avoid causing harmful interference to WMTS operations.<sup>619</sup> We believe that such a buffer zone between adjacent-band mobile telemetry and WMTS facilities can easily be maintained. Mobile telemetry will be limited to a specific radius around a fixed point therefore no wide-area operations will be permitted.<sup>620</sup> Further, mobile telemetry will be subject to frequency coordination.<sup>621</sup> Thus, we are confident that frequency coordinators will be able to recommend mobile areas of operation which will maintain the necessary distance between adjacent-band mobile units and WMTS facilities.

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because it would place 10-watt telemetry operations immediately adjacent to WMTS operations at 1429-1431.5 MHz. Therefore, we adjust the maximum EIRP for telemetry at 1431.5-1432 MHz from 10-watts to 1-watt.

<sup>613</sup> See *supra* ¶ 51. “Temporary fixed” sites are authorized on any frequency where telemetry is primary.

<sup>614</sup> Itron *ex parte* filing at 1 (May 7, 2002).

<sup>615</sup> *Id.*

<sup>616</sup> Itron did not provide a sliding scale for mobile operations within the “carve-out” areas. We have converted their sliding scale for mobile operations within the “carve-out” areas.

<sup>617</sup> AHA *Ex Parte* filing at 4, 6. (May 8, 2002)

<sup>618</sup> *Id.* at 2-6.

<sup>619</sup> AHA *Ex Parte* filing at 3. (May 8, 2002)

<sup>620</sup> See *supra* ¶ 50.

<sup>621</sup> See *supra* ¶¶ 94-98.

204. AHA also indicates that the potential for interference to WMTS operations from mobile telemetry is greatly increased at the edge of the geographic “carve-out” areas which are subject to the “band flip.”<sup>622</sup> Because non-WMTS telemetry located outside the geographic “carve-out” areas will be operating on a co-channel basis with WMTS operations within the geographic “carve-out” areas, AHA indicates that a mobile telemetry unit operating at 1 watt EIRP would need to maintain a distance of 20 miles from a WMTS facility.<sup>623</sup> We do not believe that all mobile telemetry nationwide should be limited by a situation which is unique to operations at the edge of the seven geographic “carve-out” areas. Rather, we believe that operations of non-WMTS telemetry at the edge of the geographic “carve-out” areas can be accommodated on a case-by-case basis. Accordingly, we expect frequency coordinators to examine these situations carefully to ensure that non-WMTS telemetry operations maintain the field strength limit at the location of co-channel WMTS facilities inside the geographic “carve-out” areas.

#### (iv) Field Strength Limits

205. In addition to the restrictions on telemetry we have discussed above, we believe that the balance between protecting WMTS operations from harmful interference and allowing flexible non-WMTS systems to operate in bands co-channel and adjacent to WMTS operations is best achieved by defining the permissible field strength non-WMTS facilities may radiate into the WMTS bands.<sup>624</sup> In this connection, AHA and Itron propose to limit emissions from non-WMTS telemetry – into the WMTS band – to a field strength of less than 150 uV/m at the site of any WMTS operation.<sup>625</sup> AHA and Itron would make this requirement applicable to secondary and primary non-WMTS telemetry in the 1427-1432 MHz band. In a similar manner, Philips proposes to minimize interference to WMTS operations in the 1395-1400 MHz band by limiting the out-of-band emissions from co-primary operations in the 1392-1395 MHz band.<sup>626</sup>

206. Because we believe that the proper balance between allowing viable co-channel and adjacent channel operations while still protecting WMTS from harmful interference is best achieved by a field strength limit of 150 uV/m, we are adopting this value as proposed by AHA and Itron. Consequently, we will limit the field strength that non-WMTS telemetry in the 1427-1432 MHz band may radiate – into the WMTS portions of the band<sup>627</sup> – to a measured or predicted field strength of 150 uV/m at the site of any WMTS operation.<sup>628</sup> We will also limit the field strength that facilities in the

<sup>622</sup> AHA *Ex Parte* filing at 4-5. (May 8, 2002) WMTS will operate on the frequencies 1429-1431.5 MHz inside the “carve-out” areas while primary non-WMTS telemetry will operate on the frequencies 1429.5-1432 MHz outside the “carve-out” areas.

<sup>623</sup> *Id.* at 5.

<sup>624</sup> In this instance, we believe that the potential safety of life concerns that are raised when WMTS devices receive interference distinguishes WMTS from other services that have requested similar protection in this proceeding.

<sup>625</sup> Joint Agreement at 3-4.

<sup>626</sup> See Phillips Comments at 5 and Phillips Reply Comments at 2. Phillips would limit the out-of-band emission from transmitters in the 1392-1395 MHz band to 500 uV/m at 3 meters from the radiator.

<sup>627</sup> WMTS operates in the 1427-1429.5 MHz band except in the seven geographic “carve-out” areas where WMTS operates in the 1429-1431.5 MHz band.

<sup>628</sup> This limit on the field strength radiated by a telemetry operation will apply at the location of any healthcare facility employing WMTS equipment in the 1427-1432 MHz band. Healthcare facilities are defined in 47 C.F.R. § 95.1103(b).

1392-1395 MHz band may radiate – into the WMTS band at 1395-1400 MHz – to a measured or predicted field strength of 150 uV/m at the site of any WMTS operation.<sup>629</sup>

207. We believe that the rules we are adopting in this regard are consistent with our overarching spectrum management objectives to promote both a flexible and efficient use of the electromagnetic spectrum. Under this approach, licensees will be responsible for maintaining this limitation on field strength radiated at a WMTS facility when a new location is activated. Therefore, licensees may need to adjust their operations to comply with these field strength limits if a new WMTS facility causes their existing system to exceed the 150 uV/m limit.

208. The Joint Agreement proposes measurement procedures for verifying compliance with the field strength limits at WMTS facilities.<sup>630</sup> Specifically, Itron and AHA specify that the horizontal and vertical component of the field strength should be measured over a 1 MHz bandwidth using an averaging detector.<sup>631</sup> Because we find that this resolution bandwidth is consistent with measurement procedures the Commission has established to verify out-of-band emission compliance for other services,<sup>632</sup> we will require a resolution bandwidth of 1 MHz for equipment used to verify compliance with the field strength limit. Consistent with measurement procedures established in Part 15 of our rules for equipment operating above 1000 MHz,<sup>633</sup> we will also require that measurement equipment employ an averaging detector. We believe, however, that the field strength limit should apply for any polarization and should not be limited to just horizontal or vertical polarizations. Therefore, we will not specify a polarization in the measurement procedures.

## V. PROCEDURAL MATTERS

### A. Final Regulatory Flexibility Analysis

209. A Final Regulatory Flexibility Analysis has been prepared for the *Report and Order* and is included in Appendix C.

### B. Paperwork Reduction Analysis

210. This *Report and Order* contains either a new or modified information collection. As part of the Commission's continuing effort to reduce paperwork burdens, we invite the general public and the Office of Management and Budget (OMB) to take this opportunity to comment on revision to the information collections contained in the *Report and Order* as required by the Paperwork Reduction Act of 1995.<sup>634</sup> Public and agency comments are due *[60 days after date of publication in the Federal Register]*. Comments should address:

- Whether the proposed collection of information is necessary for the proper performance of the functions of the Commission, including whether the information shall have practical utility.

<sup>629</sup> This limit on the field strength radiated by telemetry operations will apply at the location of any healthcare facility employing WMTS equipment in the 1395-1400 MHz band. Healthcare facilities are defined in 47 C.F.R. § 95.1103(b).

<sup>630</sup> Joint Agreement at 3-4.

<sup>631</sup> *Id.*

<sup>632</sup> See 47 C.F.R. §§ 27.53(a)(4) and 90.210(m).

<sup>633</sup> 47 C.F.R. § 15.209(d).

<sup>634</sup> See Pub. L. No. 104-13.

- The accuracy of the Commission's burden estimates.
- Ways to enhance the quality, utility, and clarity of the information collected.
- Ways to minimize the burden of the collection of information on the respondents, including the use of automated collection techniques or other forms of information technology.

Written comments by the public on the proposed and/or modified information collections are due 60 days after the date of publication in the Federal Register. Written comments must be submitted by the OMB on the proposed and/or modified information collections on or before 120 days after the date of publication in the Federal Register. In addition to filing comments with the Secretary, a copy of any comments on the information collections contained herein should be submitted to Judith B. Herman, Federal Communications Commission, Room 1-C804, 445 12th Street, SW, Washington, DC 20554, or via the Internet to [jboley@fcc.gov](mailto:jboley@fcc.gov), and to Ed Springer, OMB Desk Officer, Room 10236 New Executive Office Building, 725 Seventeenth Street, N. W., Washington, D.C. 20503, or via the Internet to [Edward.Springer@omb.eop.gov](mailto:Edward.Springer@omb.eop.gov). For additional information concerning the information collection(s) contained in this document, contact Judith B. Herman at 202-418-0214, or via the Internet at [jboley@fcc.gov](mailto:jboley@fcc.gov).

### C. Further Information

211. For further information concerning the *Report and Order*, contact Zenji Nakazawa or Guy Benson regarding legal matters, and/or Brian Marengo or Tim Maguire regarding engineering matters via phone at (202) 418-0680, via TTY (202) 418-7233, or via e-mail at [znakazaw@fcc.gov](mailto:znakazaw@fcc.gov), [gbenson@fcc.gov](mailto:gbenson@fcc.gov), [bmarengo@fcc.gov](mailto:bmarengo@fcc.gov) or [tmaguire@fcc.gov](mailto:tmaguire@fcc.gov), respectively, Wireless Telecommunications Bureau, Federal Communications Commission, Washington, D.C. 20554.

212. Alternative formats (computer diskette, large print, audio cassette, and Braille) are available to persons with disabilities by contacting Brian Millin at (202) 418-7426, TTY (202) 418-7365, or via e-mail to [bmillin@fcc.gov](mailto:bmillin@fcc.gov). This *Report and Order* can be downloaded from the Commission's website at [www.fcc.gov/wtb/orders](http://www.fcc.gov/wtb/orders).

## VI. ORDERING CLAUSES

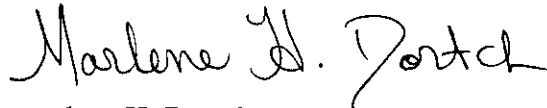
213. ACCORDINGLY, IT IS ORDERED that, pursuant to Sections 1, 4(i), 301, 302, 303(f) and (r), 309(j) and 332 of the Communications Act of 1934, as amended, 47 U.S.C. 1, 154(i), 301, 302, 303(f) and (r), 309(j) and 332, this *Report and Order* is ADOPTED.

214. IT IS FURTHER ORDERED that, Parts 1, 2, 27, 90, and 95 of the Commission's Rules ARE AMENDED as specified in Appendix E, effective 60 days after publication in the Federal Register. Information collections contained in these rules will be effective upon OMB approval.

215. IT IS FURTHER ORDERED that, the Petition for Rulemaking filed by Data Flow Systems, IS GRANTED, IN PART, AND DENIED IN PART as described herein.

216. IT IS FURTHER ORDERED that, the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this REPORT AND ORDER, including the Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION

A handwritten signature in cursive script that reads "Marlene H. Dortch". The signature is written in dark ink and is positioned above the printed name and title.

Marlene H. Dortch  
Secretary

